Monthly Oversight Report 5

ACS NPL Site

Griffith, IN

May 5, 2001 - June 1, 2001

BLACK & VEATCH

101 N. Wacker Drive
Suite 1100
Chicago, Illinois 60606-7302

Tel: (312) 346-3775
Fax: (312) 346-4781

Black & Veatch Special Projects Corp.

USEPA/RAC VII
American Chemical Services RAO (057-ROBF-05J7L1)

BVSPC Project 46526
BVSPC File C.3
June 15, 2001

Mr. Kevin Adler
U.S. Environmental Protection Agency
77 W. Jackson Boulevard (SR-6J)
Chicago, Illinois 60604-3590

Subject: Monthly Oversight Summary Report No. 5 for May 2001

Dear Mr. Adler:

Enclosed is the Monthly Oversight Summary Report No. 5 for May 2001 for the American Chemical Services Superfund Site in Griffith, Indiana.

If you have any questions, please call (312-683-7856) or email (campbelllm@bv.com).

Sincerely,

BLACK & VEATCH Special Projects Corp.

Larry M. Campbell

Larry M. Campbell, P.E.
Site Manager

Enclosure

t:\projects\acs-raos\corresp\let-006.doc

BLACK & VEATCH

101 N. Wacker Drive
Suite 1100
Chicago, Illinois 60606-7302

Tel: (312) 346-3775
Fax: (312) 346-4781

Black & Veatch Special Projects Corp.

USEPA/RAC VII
American Chemical Services RAO (057-ROBF-05J7)

BVSPC Project 46526
BVSPC File C.3
August 29, 2001

Mr. Kevin Adler
U.S. Environmental Protection Agency
77 W. Jackson Boulevard (SR-6J)
Chicago, Illinois 60604-3590

Subject: Additional Photographs for Monthly Oversight Summary Report No. 5 for May 2001

Dear Mr. Adler:

Enclosed are four additional photographs for the Monthly Oversight Summary Report No. 5 for May 2001 for the American Chemical Services Superfund Site in Griffith, Indiana. I had taken these photographs of the onsite drum removal activities on my personal camera and had not gotten them developed when Report No. 5 was issued.

If you have any questions, please call (312-683-7856) or email (campbelllm@bv.com).

Sincerely,

BLACK & VEATCH Special Projects Corp.

Larry M. Campbell

Larry M. Campbell, P.E.
Site Manager

Enclosure

t:\projects\acs-raos\corresp\let-011.doc

Monthly Oversight Summary Report No. 5
ACS Superfund Site WA30, 46526.238

Reporting Period: Month of May (May 5 - June 1, 2001)
BVSPC O/S Dates: May 8, 10, 14, 17, 22, 24, 30 and 31, 2001

Personnel Summary Affiliation	No. of Personnel	Responsibility
Montgomery Watson, Warrenville, IL	9	Respondent's General Contractor
Black & Veatch Special Projects Corp. (BVSPC)	1	USEPA Oversight Contractor
Mid American Drilling	2	Drilling Contractor
Top Flight Environmental Drilling	2	Geoprobe Contractor
Koester Environmental Services	7	Buried Drum Removal Contractor
Midwest Environmental, Inc.	6	IDW Drum Management/ Detention Pond Contractor

Construction Activities

Major Activities:

- ORC injection completed (Montgomery Watson with Mid American Drilling).
- Sample ORC wells in south area pilot study (Montgomery Watson).
- Completion of buried drum removal activities in the onsite area (Koester Environmental & Montgomery Watson).
- Begin construction of detention pond, IDW drum and spoils management, and placement of interim cap in south offiste area (Midwest Environmental Services, Inc. & Montgomery Watson).

Activities Performed:

ORC injections have been completed in the south area pilot study as of May 11, 2001. Montgomery Watson sampled the five ORC wells on May 22, 2001.

Koester Environmental completed the drum removal activities in the onsite area. The following tabulates the removal data:

	No. of Intact Drums Removed	No. of Non-intact Drums Removed	No. of Drums Sampled & Analyzed	C.Y. of Debris to Firepond
Area A	137	1022	137	1514.5
Area B	112	427	112	981.5
Total	249	1449	249	2496

Overall the drum removal went well. The work was completed in a timely manner, and the contractors involved were responsive to the questions and concerns raised by BVSPC. There were, however, several events where proper procedures were not being followed within the exclusion zone. The most frequent offense was personnel entering the exclusion zone without respiratory protection before the zone was properly downgraded from Level B. Each instance was accompanied by a discussion with Montgomery Watson's Health & Safety Manager, where the importance of compliance was reiterated.

Koester Environmental Services demobilized on June 1, 2001. Disposal options for the overpacked drums, as well as for the debris in the roll off boxes, are still being investigated. Meanwhile, Montgomery Watson has stated they will perform visual inspections and air monitoring twice daily on the overpacks and the roll offs. The overpacked drums are located on the concrete drum pad, which is surrounded by plastic fencing. The roll off boxes are located just to the south and west of the pad. BVSPC suggested that these roll offs be surrounded by fencing as well, due to the high truck traffic in the area.

On May 14, 2001, Mid American Drilling performed the abandonment of MW-W1 under the supervision of Montgomery Watson. MW-55, which was installed in April, will serve as its replacement.

Midwest Environmental, Inc., along with its subcontractor RW Collins, arrived on site on May 17, 2001. The Investigation Derived Waste (IDW) drums were sheared and placed in the upper aquifer spoils pile, along with the contents of the drums. The debris from the K-P building was placed in this location as well. The PCB and VOC spoils piles were regraded in the south portion of the offsite area. The detention pond in the northwest corner is 70% completed. Some minor grading and placement of rip rap remains.

Attached are BVSPC's weekly reports, correspondences, log book notes, and photographs of the daily activities. BVSPC's crew conducted oversight of the major field activities during May 8, 10, 14, 17, 22, 24, 30 and 31, 2001.

Topics of Concern:

- Montgomery Watson was unable to obtain a groundwater elevation at monitoring well MW-18 due to debris in the well. MW-18 is part of the long term monitoring program.
- Installation of the abandonment casing around ATMW-4D is suspect as to its effectiveness because the outer casing was driven in with the kelly bar and the auger chuck. Driving the casing down does not allow the tremmie pipe to reach the bottom of the annulus space on the outside of the casing for proper grouting.
- Personnel have entered exclusion zone without respiratory protection before the area had been cleared for reduced PPE.
- Koester Environmental has begun to damage unopened drums during excavation, causing product to leak.

Concern Resolution:

- Montgomery Watson committed to enforce more rigorously proper exclusion zone behavior.
- Koester will have more workers on hand to aid in the removal of drums without unnecessary damage.

Upcoming Activities:

- Construction of detention pond continues in offsite area.
- Cap installation in offsite area.
- PCB soil removal in wetlands tentatively scheduled for July.
- Draft of RFB for ISVE wells to be complete in next two weeks.
- Installation of wells in offsite area for ISVE system to occur in late June.
- Long term groundwater monitoring - June 2001 round scheduled for the week of June 18, 2001.

Signatures: Margaret Mulkerrin **Date:** June 12, 2001

T:\projects\acs-raos\osr\2001\Mo05.wpd

Weekly Oversight Summary Report No. 10
ACS Superfund Site WA30, 46526.238

Reporting Period: Week of May 7, 2001
BVSPC O/S Dates: May 8, 2001 and May 10, 2001(Ms. Mulkerrin)

Personnel Summary Affiliation	No. of Personnel	Responsibility
Montgomery Watson, Warrenville, IL	7	Respondent's General Contractor
Black & Veatch Special Projects Corp. (BVSPC)	1	USEPA Oversight Contractor
Koester Environmental Services	7	Drum Removal Contractor
Top Flight Environmental Drilling	2	Geoprobe Contractor

Construction Activities

Major Activities:

- ORC injection completed in the south area on May 11, 2001 (Montgomery Watson with Top Flight Environmental Drilling).
- Buried drum removal (Montgomery Watson with Koester Environmental Services).
- Weekly construction coordination meeting.

Activities Performed:

ORC injections have been completed as of May 11, 2001. A total of 218 ORC injection points were completed in south area pilot study. The next step, which is the sampling of the ORC wells, is tentatively scheduled for the end of May.

Koester continues to excavate buried drums in Area A on the onsite area. As of May 9, 2001, production is as follows:

Time Period	No. of Intact Drums Reomved	No. of Non-intact Drums Removed	No. of Drums Sampled	No. of Drums Analyzed	C.Y. of Debris to Firepond
5/2/01 - 5/9/01	82	404	50	46	747.5

Total to Date	128	737	98	79	1016

Maureen Handler is compiling information on the results of the sample analysis. She has been staging the drums according to the following categories: chlorinated, flammable, non-flammable, paraffin, oil, and hold (require further testing). Koester submits a daily report of the HAZCAT analysis to Montgomery Watson.

There are currently 17 roll-off boxes on site, eight of which are full. Todd Lewis, of Montgomery Watson, stated he would like to develop a method of tracking what is being placed in each box, and at what point they are full. Matt Grostick, of Montgomery Watson, added that he performs a daily visual inspection and continually monitors the air quality around the filled roll-off boxes. He is also in the process of creating a procedure for monitoring these boxes on a weekly basis once active work has ceased.

On May 8, 2001 Montgomery Watson discovered that EW 18 was not functioning properly. This was due to the fact that it was connected to the wrong effluent line when installed. Montgomery Watson was able to identify the problem and began working on it immediately. EW 18 was back online by May 10, 2001. EW 10 and EW 20 were also online, although it was suspected that EW 20 was not fully developed, and Montgomery Watson plans on utilizing a down hole camera to investigate for problems in the line next week.

The GWTP was in a recycle mode this week because new activated carbon had to be installed. A bypass for the firepond was activated which directed fluid from the firepond to the bioreactor behind the plant. Montgomery Watson believed this storage would be more than sufficient until the plant could begin treating again.

During the delivery of clean backfill to Area A , BVSPC witnessed a truck driver drive into the exclusion zone and get out of his truck very close to where the sampling of excavated drums was occurring. The truck driver was not wearing any form of PPE. This incident was brought to the attention of Montgomery Watson's Health & Safety coordinator, Matt Grostick. Matt immediately spoke with Koester's foreman, Jamie Bergeron, about this behavior. He stated that sampling and excavation cannot be occurring when any deliveries are being made withing the exclusion zone. BVSPC also spoke with Matt Grostick about the importance of following procedure when downgrading the site from Level B to allow for non-intrusive activities to take place without the use of respiratory protection. BVSPC stated that in order for the area to be downgraded, proper air-monitoring must be done, and everyone must be aware of the status of the exclusion zone at all times (e.g., posting the level at the entrance to the exclusion zone). This point was reinforced by BVSPC at the weekly construction meeting, as well.

Montgomery Watson will issue an addendum to the HASP for the buried drum removal that will allow the operators and the safety personnel to wear Tyvek suits (instead of PVC) due to the rising temperatures. All personnel within the exclusion zone who come in direct contact with the drums or drum contents will continue to wear the PVC suits.

Topics of Concern:

- Montgomery Watson was unable to obtain a groundwater elevation at monitoring well MW-18 due to debris in the well. MW-18 is part of the long term monitoring program.
- Installation of the abandonment casing around ATMW-4D is suspect as to its effectiveness because the outer casing was driven in with the kelly bar and the auger chuck. Driving the casing down does not allow the tremmie pipe to reach the bottom of the annulus space on the outside of the casing for proper grouting.
- Personnel have entered the exclusion zone without respiratory protection before the area had been cleared for reduced PPE.

Concern Resolution:

- Onsite Health & Safety concerns were addressed by Kevin Adler. The following items shall be instituted to ensure safety is upheld:
  1. Tail gate safety meetings will be held every morning by each subcontractor which will include reviewing a standard check off list.
  2. A site safety coordinator will be designated.
  3. A personnel chart shall be created, listing staff persons and the activities for which each are responsible.
- At the weekly construction meeting, Montgomery Watson committed to enforce more rigorously proper exclusion zone behavior.

Upcoming Activities:

- Koester Environmental anticipates being complete with drum removal in Area A, and begin excavating Area B by Tuesday, May 15, 2001.
- Offsite spoil management/regrading expected to begin mid-May.
- Abandon Monitoring Well W-1.

Signature: Margaret Mulkerrin Date: May 23, 2001

t:\projects\acs-raos \osr\2001\0507.wpd

ACTION ITEMS FROM WEEKLY CONSTRUCTION MEETING - MAY 10, 2001 AMERICAL CHEMICAL SERVICES NPL SITE

MEETING DATE: May 10, 2001

MEETING TIME: 10:00 AM

MEETING LOCATION: Site Trailer, ACS NPL Site

ATTENDEES:

Margaret Mulkerrin – Black & Veatch
Robert Adams – Montgomery Watson
Matt Grostick – Montgomery Watson
Todd Lewis – Montgomery Watson
Tom Tinics – Montgomery Watson
Peter Vagt – Montgomery Watson
Doug Draia – ACS
Maureen Handler – Koester

ACTION ITEMS

Health and Safety

- A Site Health and Safety Audit was conducted by Mike Grasso of Montgomery Watson. The result was favorable report with only minor comments. The comments have been addressed.
- Matt Grostick stated that air monitoring results are being posted daily.
- The radiation monitoring results were discussed as well as discussion regarding proposing to discontinue the radiation monitoring after a few days of monitoring at Area B. The attendees agreed not to propose to discontinue radiation monitoring at this time.
- Tom Tinics stated that a reporter entered the ACS Facility property through the ACS gate on Friday, May 4, 2001. The reporter was denied access to the area surrounding drum removal because she did not have proper documented permission from U.S. EPA and escorted off site.
- Montgomery Watson will begin keeping the Site access gate closed and post no trespassing signs.
- Montgomery Watson will compile the air monitoring results through May 11, 2001 and transmit them to Kevin Adler of the U.S. EPA.
- Margaret Mulkerrin noted that it appeared exclusion zone entry by truck drivers or other support personnel occurred without clearing the areas for reduced PPE. Montgomery Watson committed to scrutinize access to the exclusion zone more thoroughly.

Drum Removal Update

- Production totals as of end of day May 9, 2001
  - Intact drums overpacked: 128
  - Non-intact drums placed into roll-off boxes: 737
  - Drums sampled: 98
  - Samples analyzed: 79
  - Soil placed into firepond: 1,016 cubic yards
- KES anticipates to have Area A will be backfilled by Monday May 14, 2001; begin to reconfigure exclusion zone on May 14, 2001; and begin Area B by May 15 or 16, 2001.
- KES has began pre-segregating drums based on the similarity contents as determined by the HAZCAT analysis results.
- ACS, Montgomery Watson, and KES personnel will coordinate identification and applicable jacketing of power/communication cables located above Area B.

General Site Update

- Abandonment of ATMW-4D is complete
- Installation of replacement well MW-55 is complete
- ORC® Installation was completed May 9, 2001 at 10:00 AM
- The Stormwater Pollution Prevention Plan (SWPPP) is complete and will be maintained on site. The Notice of Intent was submitted to IDEM

Look Ahead Schedule

- May 11, 2001 – KES anticipates excavation complete with drum removal Area A.
- May 14, 2001 – Begin abandonment of Monitoring Well W-1
- Week of May 14, 2001 – Order oxidizer for Off-Site ISVE system
- May 17, 2001 – Begin installation of erosion control measures for installation of the Temporary Cover in the Off-Site Area

NEXT MEETING: Thursday, May 17, 2001 at 10:00 AM at ACS Construction Trailer.

RAA/PJV/TAL/RAA
J:\209\0601 ACS\0202 MWA PM\6010202a031.doc

Weekly Oversight Summary Report No. 11
ACS Superfund Site WA30, 46526.238

Reporting Period: Week of May 14, 2001
BVSPC O/S Dates: May 14, 2001 and May 17, 2001(Ms. Mulkerrin)

Personnel Summary Affiliation	No. of Personnel	Responsibility
Montgomery Watson, Warrenville, IL	6	Respondent's General Contractor
Black & Veatch Special Projects Corp. (BVSPC)	1	USEPA Oversight Contractor
Koester Environmental Services	6	Drum Removal Contractor
Mid American Drilling	2	Drilling Contractor
Midwest Environmental, Inc.	6	IDW Drum Management / Detention Pond Contractor

Construction Activities

Major Activities:

- Completion of Area A buried drum removal. Begin removal activities in Area B (Montgomery Watson with Koester Environmental Services)
- Abandon MW-W1 (Montgomery Watson with Mid American Drilling)
- Begin IDW Drum & Spoils Management in south offsite area (Midwest Environmental, Inc.)
- Weekly construction coordination meeting

Activities Performed:

Koester completed the drum removal in Area A and replaced the excavation with clean fill after all visible contamination had been removed from the excavation per Montgomery Watson personnel. The exclusion zone was reconfigured to incorporate Area B, and Koester began excavating on Tuesday May 15, 2001. The excavation focused on the area alongside the E-epoxy building, and underneath the concrete pad entryway. Drums were not present along the building or underneath the pad, so the area was then backfilled. Upon completion of Area A, the totals are as follows:

Time Period	No. of Intact Drums Removed	No. of Non-intact Drums Removed	No. of Drums Sampled	No. of Samples Analyzed	C.Y. of Debris to Firepond
5/10/01 - 5/16/01	9	285	39	58	498.5
Complete Total	137	1022	137	137	1514.5

On May 14, 2001, the abandonment of MW-W1 was performed by Mid American Drilling under the supervision of Chad Smith of Montgomery Watson. The abandonment included placing an 8" diameter casing around the well, and grouting the inside, as well as the outside of the well with a bentonite slurry. The well will remain in place, as allowed by the State of Indiana.

Midwest Environmental, Inc. arrived on site on May 17, 2001. Montgomery Watson gave the new contractors a safety orientation. Their work includes handling the IDW drums and the spoils piles in the south offsite area, as well as constructing the detention pond. They began sheering the IDW drums and emptying their contents, as well as excavating the new detention area on the afternoon of May 17, 2001. Once this work is completed, they will focus on the installation of the interim cap in this area. Montgomery Watson is considering going to final cap status in the non-engineered area.

In the discussion of future cap installation for the site, Pete Vagt of Montgomery Watson suggested that the existing piezometers be abandoned and new be ones installed once the cap is complete. Pete felt it would be most time and cost effective to take this approach. If the decision is made to abandon the existing and replace with new, the abandonment of the piezometers outside the onsite barrier wall will be done per IDEM requirements.

Topics of Concern:

- Montgomery Watson was unable to obtain a groundwater elevation at monitoring well MW-18 due to debris in the well. MW-18 is part of the long term monitoring program.
- Installation of the abandonment casing around ATMW-4D is suspect as to its effectiveness because the outer casing was driven in with the kelly bar and the auger chuck. Driving the casing down does not allow the tremmie pipe to reach the bottom of the annulus space on the outside of the casing for proper grouting.
- Personnel have entered the exclusion zone around the drum excavation without respiratory protection before the area had been cleared for reduced PPE.

Concern Resolution:

- Onsite Health & Safety concerns were addressed by Kevin Adler. The following items shall be instituted to ensure safety is upheld:
  1. Tail gate safety meetings will be held every morning by each subcontractor which will include reviewing a standard check off list.
  2. A site safety coordinator will be designated.
  3. A personnel chart shall be created, listing staff persons and the activities for which each are responsible.

- At the weekly construction meeting, Montgomery Watson committed to enforce more rigorously proper exclusion zone behavior.

Upcoming Activities:

- Koester Environmental continues excavation in Area B.
- IDW drums and spoils pile management continues in offsite area.
- Construction of detention pond continues in offsite area.
- PCB soil removal in wetlands tentatively scheduled for July.
- Draft of RFB for ISVE wells to be complete in next two weeks.

Signature: Margaret Mulkerrin Date: May 23, 2001

t:\projects\acs-raos \osr\2001\0514.wpd

MINUES FFROM
WEEKLY CONSTRUCTION MEETING - MAY 17, 2001
AMERICAL CHEMICAL SERVICES NPL SITE

MEETING DATE: May 17, 2001

MEETING TIME: 10:00 AM

MEETING LOCATION: Site Trailer, ACS NPL Site

ATTENDEES:

Margaret Mulkerrin – Black & Veatch
Robert Adams – Montgomery Watson
Matt Grostick – Montgomery Watson
Todd Lewis – Montgomery Watson
Tom Tinics – Montgomery Watson
Peter Vagt – Montgomery Watson
Joe Willich – Montgomery Watson
Doug Draia – ACS
Maureen Handler – Koester (KES)
Ken Field – Midwest Environmental (MEI)

ACTION ITEMS

Health and Safety

- ACS has begun air monitoring in their building located adjacent to Area B of the drum removal. Doug Draia reported that they have had no detections in the building.
- Matt Grostick distributed the Health and Safety Plan revision for the Drum Removal. This revision allows for change of Saranex® PPE body suits to Tyvek® PPE body suits.
- KES has noticed ACS employees watching the drum removal activities at a close proximity (but not in the exclusion zone or contaminant reduction zone.). If KES operators notice people entering outer caution tape, they will stop work and activate horn until the non-authorized people have left the area.
- A Kick-off Health and Safety meeting was conducted with MEI (the subcontractor performing the temporary cover construction and spoils pile consolidation). The meeting was conducted May 17, 2001 and included respirator fit testing.
- Daily air monitoring results for the Off-Site Temporary Cover work will be posted daily in the same location as the air monitoring logs from the drum removal.

Drum Removal Update

- Production totals as of end of day May 6, 2001
  - Intact drums overpacked: 137
  - Non-intact drums placed into roll-off boxes: 1,022
  - Drums sampled: 137
  - Samples analyzed: 137 (flash point still needs to be done for 15 samples)
  - Soil placed into area previously used as a firepond: 1514.5 cubic yards
- The last drums in Area A were removed May 11, 2001. KES still needs to reconstruct the road that bisected Area A.
- Utilities (water, electrical, and communication) in Area B have been located, marked, and locked-out, as appropriate.
- KES will not work May 25, 2001 through May 29, 2001 due to Memorial Day Weekend.

Off-Site Area Temporary Cover

- Field activities began today (May 17, 2001) for the erosion control measures associated with the Off-Site Area Temporary Cover. Prior to work, a Health and Safety Kick-off Meeting was conducted and respirator fit testing was performed for the subcontractors for the temporary cover work.
- MEI (subcontractor) anticipates completing the sedimentation basin by next weekend (May 25, 2001).
- Hay bales will be used for erosion control until the silt fencing arrives.
- Montgomery Watson will propose abandoning the piezometers located just outside of the Off-Site Area and demolishing the piezometers located within the barrier wall. The piezometers will be replaced after construction of the temporary cover is complete.

General Site Update

- Abandonment of W-1 was completed on Monday, May 14, 2001.
- Installation of replacement well MW-55 is complete.

Look Ahead Schedule

- Week of May 21, 2001 – continue drum removal in Area B, continue Off-Site Area material consolidation and temporary cover work, and order thermal oxidizer for OFCA and K-P Area ISVE system.
- May 25, 2001 – Anticipated completion date for the sedimentation basin for the Off-Site Area cover work.

NEXT MEETING: Thursday, May 24, 2001 at 10:00 AM at ACS Construction Trailer.

RAA/PJV
J:\209\0601 ACS\0202 MWA PM\6010202a032.doc

Weekly Oversight Summary Report No. 12
ACS Superfund Site WA30, 46526.238

Reporting Period: Week of May 21, 2001
BVSPC O/S Dates: May 22, 2001 and May 24, 2001 (Ms. Mulkerrin)

Personnel Summary Affiliation	No. of Personnel	Responsibility
Montgomery Watson, Warrenville, IL	9	Respondent's General Contractor
Black & Veatch Special Projects Corp. (BVSPC)	1	USEPA Oversight Contractor
Koester Environmental Services	6	Drum Removal Contractor
Security Fence	3	Fence Installation Contractor
Midwest Environmental Inc.	4	IDW Drum Management / Detention Pond Contractor

Construction Activities

Major Activities:

- Completetion of Area B buried drum removal (Montgomery Watson with Koester Environmental Services).
- Sample ORC wells in south area pilot study (Montgomery Watson).
- Begin IDW drum & spoils management in south offsite area (Midwest Environmental Inc.)
- Weekly construction coordination meeting

Activities Performed:
Koester completed the drum removal in Area B as of May 23, 2001. Upon completetion of Area B, the totals are as follows:

Time Period	Intact Drums Removed	Non-intact Drums Removed	Drums Sampled	Samples Analyzed	C.Y. of Debris to Firepond
5/16/01 - 5/24/01	112	427	112	46	929.5
Complete Total	249	1449	249	183	244

On May 22, 2001, Koester Environmental was excavating drums from Area B. The backhoe operator began to damage drums while excavating, causing several to spew product. Sean Grady, of IDEM, asked Pete Vagt, of Montgomery Watson, why another person was not there directing the operator in order to prevent this from occurring. Pete Vagt and Matt Grostick instructed Koester to stop excavating. Matt Grostick then had a discussion with Koester stating that more care needed to be taken in excavating the drums in order to prevent unnecessary loss of drum contents. Koester claimed they did not want a person in the excavation due to its depth and the fact that groundwater was starting to accumulate. They did admit that some of the damaged drums should have been saved, although they added that several appeared to have been ruptured already. They said they would use more caution in the future. Koester did not excavate any more drums that day.

The removal of drums from Area B was completed on May 23, 2001. The excavation will remain open over the Memorial Day holiday weekend. Koester will return on Wednesday, May 30, 2001, to dewater the excavation, verify with Montgomery Watson that the excavation is complete, and begin to backfill Area B.

Midwest Environmental, Inc. continued work in the Offsite Containment Area. The detention pond in the northwest corner of the area has been excavated. The surrounding berm and outfall structure have been installed, and rip-rap remains to be laid. The IDW drums contents have been spread and the drums sheared. The K-P building debris is currently being sheared and/or hauled to the proper area (outside of the ISVE footprint). MEI and RW Collins adjusted the height of well manholes in this area to accommodate the raise in grade when the new cap is installed.

Montgomery Watson attempted to use a down-hole camera in EW20 to investigate causes for its poor performance. This work was delayed due to rain.

Chad Smith and Rudy Stein, of Montgomery Watson, sampled the five ORC wells located in the south pilot study area on May 22, 2001.

Topics of Concern:

- Montgomery Watson was unable to obtain a groundwater elevation at monitoring well MW-18 due to debris in the well. MW-18 is part of the long term monitoring program.
- Installation of the abandonment casing around ATMW-4D is suspect as to its effectiveness because the outer casing was driven in with the kelly bar and the auger chuck. Driving the casing down does not allow the tremmie pipe to reach the bottom of the annulus space on the outside of the casing for proper grouting.
- Personnel have entered the exclusion zone without respiratory protection before the area had been cleared for reduced PPE.
- Koester Environmental has begun to damage unopened drums during excavation, causing product to leak.

Concern Resolution:

- Montgomery Watson committed to enforce more rigorously proper exclusion zone

behavior.

- Koester will have more workers on hand to aid in the removal of drums without unnecessary damage.

Upcoming Activities:

- Koester Environmental to backfill excavation in Area B and demobilize from site.
- IDW drums and spoils pile management continues in offsite area.
- Construction of detention pond continues in offsite area.
- Cap installation to begin in offsite area.
- PCB soil removal in wetlands tentatively scheduled for July.
- Draft of RFB for ISVE wells to be complete in next two weeks.

Signature: Margaret Mulkerrin Date: June 1, 2001

t:\projects\acs-raos \osr\2001\0521.wpd

WEEKLY CONSTRUCTION MEETING MINUTES
FOR MAY 24, 2001 MEETING
AMERICAL CHEMICAL SERVICES NPL SITE

MEETING DATE: May 24, 2001

MEETING TIME: 11:15 AM

MEETING LOCATION: ACS Site – Site Trailer

ATTENDEES:

Robert Adams – Montgomery Watson
Travis Klingforth - Montgomery Watson
Margaret Mulkerrin – Black & Veatch
Matt Grostick - Montgomery Watson
Steve Field – Midwest Environmental
Peter Vagt - Montgomery Watson
Maureen Handler – Koester Environmental
Tom Tinics - Montgomery Watson
Todd Lewis - Montgomery Watson

TOPICS:

Health and Safety

- Matt Grostick reviewed the Health and Safety activities for the Drum Removal which was on-going: air monitoring, maintenance of the exclusion zone, wearing proper personal protective equipment (PPE), etc. Koester Environmental Services (KES) has added an interior exclusion fence around the excavation for additional protection during the Memorial Day weekend. Radiation testing has been performed on all of the overpacked drums and all of the roll-off bins full of non-intact drums. No radiation was detected.
- Tom Tinics reviewed the Health & Safety measures being implemented in the installation of the Off-Site Temporary Cover. For the first two days of work, the crew, run by Midwest Environmental, Inc. (MEI), wore level C PPE and conducted regular air monitoring. All readings were "non-detect." Therefore, MEI has continued the re-grading work in level D PPE.

Drum Removal Update

- Production totals as of end of day May 23, 2001
  - Intact drums overpacked: 249
  - Non-intact drums placed into roll-off boxes: 1,449
  - Drums sampled: 249
  - Samples analyzed: 183
  - Soil placed into firepond: 2,444 cubic yards
- Maureen Handler of KES reported that as of yesterday all of the drums have been removed from the ground, and all of the drums have been sampled. Hazcat analysis continues to be performed and will be done by early next week. KES will remove the

remaining visually-contaminated soil and backfill and compact the excavation. Demobilization will occur by next Friday or early in the following week.

Off-Site Temporary Cover

- Tom Tinics overviewed activities related to the Off-Site Temporary Cover. The retention pond has been excavated and some rip-rap has already been put in the place. The remaining rip-rap will be installed next week. The five original manholes of the extraction system will be raised next week to the proposed final grade of the engineered cover.
- The IDW drums and K-P Area debris has been re-located for capping.
- Spoils pile relocation/consolidation and regrading to the sub base grades is schedule to begin next week.
- Survey controls for base grading will be set-up and existing clay thickness will be measured.

Summary of Additional Activities in Past Two Weeks

- The Groundwater Treatment Plant is online and there is positive evidence that a viable "bug population" is in place.
- Todd Lewis has ordered the oxidizer for the In-Situ Vapor Extraction (ISVE) work in the Off-Site Area.

Looking Ahead to Next Two Weeks

- The drum removal is anticipated to be completed and KES demobilized by Friday, June 1, 2001 or early in the following week.
- Construction of Off-Site Temporary Cover will continue.
- The Draft RFB for ISVE wells will be completed.

NEXT MEETING:

- Thursday, May 31, 2001 at 10:00 AM at the ACS Site Trailer

Weekly Oversight Summary Report No. 13
ACS Superfund Site WA30, 46526.238

Reporting Period: Week of May 28, 2001
BVSPC O/S Dates: May 30 and 31, 2001 (Ms. Mulkerrin)

Personnel Summary Affiliation	No. of Personnel	Responsibility
Montgomery Watson, Warrenville, IL	8	Respondent's General Contractor
Black & Veatch Special Projects Corp. (BVSPC)	1	USEPA Oversight Contractor
Koester Environmental Services	6	Drum Removal Contractor
Midwest Environmental, Inc.	3	IDW Drum Management / Detention Pond Contractor

Construction Activities

Major Activities:

- Completetion of buried drum removal (Montgomery Watson with Koester Environmental Services).
- Regrading of PCB and VOC spoils piles in the south offsite area (Midwest Environmental, Inc. & Montgomery Watson).
- Continued placement of debris in upper aquifer spoils management pile in south offisite area (Midwest Environmental, Inc. & Montgomery Watson).
- Weekly construction coordination meeting.

Activities Performed:
Koester completed the final excavation and backfilling necessary in the onsite area on May 31, 2001. Upon completetion of the drum removal, the grand totals are as follows:

Time Period	Intact Drums Removed	Non-intact Drum Removed	Drums Sampled	Samples Analyzed	C.Y. of Debris to Firepond
4/27/01 - 5/31/01	249	1449	249	249	2496

Koester spent the majority of the week backfilling the excavation in Area B, restoring the truck access road that was demolished due to the excavation in Area A, and reshaping the exclusion zone to only incorporate the drum staging pad. The roll off boxes containing drum carcasses were moved to two areas: one just

west of the drum staging pad, and the other to the south of the pad. These areas were favorable because they provided easy access to Montgomery Watson for inspection. BVSPC inquired as to what type of protection would surround the roll off boxes. Montgomery Watson agreed to surround the boxes with either plastic fencing or caution tape.

During Koester's final excavation and backfilling activities, several incidents occurred where proper procedures were not followed within the exclusion zone. While the last of the contaminated soils were being removed from the excavation, an activity requiring Level B protection, an operator was backfilling without wearing any PPE. Once excavation ceased, another operator simply removed his respiratory protection and stepped out of his backhoe without the proper downgrading of the exclusion zone taking place. BVSPC spoke with Montgomery Watson's Health & Safety manager and informed him that exclusion zone procedures must be followed up through project completion. Koester demobilized on June 1, 2001.

Midwest Environmental, Inc. continued work in the Offsite Containment Area. Rip rap has been placed along the sides of the detention pond. Additional rip rap will be placed on the bottom of the pond, and final grading will occur once the area has dried out and smaller equipment is available to do the work. The PCB and VOC spoils piles have been spread and will be capped once clay is brought in to the site. Montgomery Watson anticipates that to occur within the next two weeks.

In the weekly construction progress meeting, Montgomery Watson discussed a pilot study that will occur in the offsite area. The purpose of this study is to determine the most effective method for drilling wells for the ISVE system. This study is set to occur in the next two weeks. It was also mentioned that the design of the access road to the blower shed for the ISVE system in the offsite area has been modified. Instead of entering the area from the north gate off of Colfax, the road will now come through the south gate. This design will allow for a shorter road, and will be on higher ground.

Topics of Concern:

- Montgomery Watson was unable to obtain a groundwater elevation at monitoring well MW-18 due to debris in the well. MW-18 is part of the long term monitoring program.
- Installation of the abandonment casing around ATMW-4D is suspect as to its effectiveness because the outer casing was driven in with the kelly bar and the auger chuck. Driving the casing down does not allow the tremmie pipe to reach the bottom of the annulus space on the outside of the casing for proper grouting.
- Personnel have entered exclusion zone without respiratory protection before the area had been cleared for reduced PPE.
- Koester Environmental has begun to damage unopened drums during excavation, causing product to leak.

Concern Resolution:

- Montgomery Watson committed to enforce more rigorously proper exclusion zone behavior.
- Koester will have more workers on hand to aid in the removal of drums avoiding

unnecessary damage.

Upcoming Activities:

- Final grading of detention pond in offsite area.
- Cap installation in offsite area.
- Pilot study for drilling method in offsite area.
- PCB soil removal in wetlands tentatively scheduled for July.
- Draft of RFB for ISVE wells to be complete in next two weeks.
- Long term groundwater monitoring - June 2001 round scheduled for the week of June 18, 2001.

Signature: Margaret Mulkerrin Date: June 12, 2001

t:\projects\acs-raos \osr\2001\0528.wpd

WEEKLY CONSTRUCTION MEETING MINUTES
MAY 31, 2001 MEETING
AMERICAN CHEMICAL SERVICE, NPL SITE

MEETING DATE: May 31, 2001

MEETING TIME: 10:00 AM

MEETING LOCATION: ACS Site – Site Trailer

ATTENDEES:

Matt Grostick - Montgomery Watson (MW)
Margaret Mulkerrin – Black & Veatch
Mark Travers – de maximis
Alex Ellwood – MW
Todd Lewis - MW
Maureen Handler – Koester Environmental Services (KES)
Jack Field - KES
Peter Vagt - MW
Rob Adams - MW
Ken Field – Midwest Environmental Inc. (MEI)
Steve Field - MEI
Chris Daly - MW
Tom Tinics - MW

TOPICS:

1. Health and Safety

Drum Removal: Air monitoring logs continue to be posted daily. The intrusive activities are complete, so the crew has downgraded from Level B personal protective equipment (PPE) to Level D. The one exception is in the event of wet decontamination activities, in which case splashguards will be used. Daily tailgate safety meetings are still being conducted at 7 am and will continue until the drum removal field work is complete.

The exclusion zone fencing is in the process of being removed, however an exclusion zone will be maintained around the concrete drum-staging pad. If the tarps need to be removed from the roll-off boxes, level B PPE may be required, but will be handled on a case-by-case basis.

The high-visibility tape which marked the electrical lines near the excavation area B will be removed by Monday, June 4, 2001. After the caution tape has been removed, the lines will be re-energized.

Off Site Temporary Cover: Regular air monitoring continues to be conducted each work day, particularly in the cabs of all vehicles and equipment. Midwest Environmental Inc. (MEI) provides daily air monitoring logs. No sustained elevated readings have been recorded. Occasional peaks of 4-5 parts per million (ppm) have been recorded. The

volatile organic compound (VOC) pile is giving off odor. PID readings have been about 10 ppm downwind. Therefore, workers remain upwind. The areas will be covered with the clay that was temporarily removed as soon as practical. Once spoil piles are moved to create the final grade for the Off-Site Area, air monitoring will be discontinued.

2. Drum Removal Update

Production totals as of the end of day May 30, 2001:

- Intact drums overpacked: 249
- Non-intact drums placed into roll-off boxes: 1,449
- Drums sampled: 249
- Samples analyzed: 249
- Soil placed into firepond: 2,496 cubic yards

Two samples will be prepared on May 31, 2001 and sent to the lab for PCB analysis. Three samples of chlorinated paraffins will be composited and sent to the lab for analysis. Prior to May 31, 2001, no samples had been sent off to the lab for analysis.

Currently, Koester Environmental Services (KES) is decontaminating their equipment and preparing to demobilize. They expect to be off site by Friday, June 1, 2001. The KES trailer will remain on site for a few more weeks as KES has already paid for its use. The four-ounce Hazcat sample jars collected and analyzed by KES will be stored in the groundwater treatment plant next to the samples already collected by MW.

The Geiger counter, which was used to confirm that no radiation was present in the excavated drums, was sent back to the rental company last Thursday.

3. Off-Site Area Temporary Cover

The retention pond basin has been excavated, and is currently about 70 percent lined with stone. All IDW drums have been sheared and buried in a ravine near the upper aquifer spoils piles. The spoils piles are currently being leveled out over the buried material.

The location of the swale leading to the retention pond has been determined, however construction can't continue currently due to wet conditions. To date, over 2,000 feet of silt fencing has been installed along the west side of the Site to prevent erosion.

The planned access gate to the ISVE blower shed has been changed from the north gate to the south gate. The south gate will provide a shorter path with a greater elevation. All manholes except Manhole 17 have been raised to the elevation of the final grade.

For the remainder of the week, MEI will continue to re-grade and cut swales into the west side of the site to establish a clear drainage path. Rough grading should be finished by the middle of next week, weather permitting.

Approximately twelve garbage bags of used PPE and miscellaneous Hazcat waste (pipettes, test tubes, etc.) will be handled as Investigation-Derived Waste (IDW).

4. Summary of Past Two Weeks

Groundwater Treatment Plant: On Friday, May 25 it was observed that some piping within between the equalization tank and the Lamella Clarifier was getting fouled. MW will collect a sample to determine the cause of fouling.

Extraction wells 11 and 20 were offline on May 31, 2001. MW continues sufficient extraction rates to maintain the water level inside the barrier wall of the on-site area.

Soil Vapor Extraction (SVE) System: MW has ordered Oxidizer 1. MW is still working on ordering a blower. A site meeting is scheduled for June 12, 2001 to address general issues regarding the SVE system.

A drill rig may conduct test borings next week on site to determine the most effective method for installing the SVE wells. The Request for Proposal will be sent out next week for SVE well installation.

5. Looking Ahead to Next Two Weeks

Drum Removal: KES will complete demobilization.

Off-Site Temporary Cap: Rough grading will be completed by next week, weather permitting. Area Survey will survey in final grades of the interim levels. The temporary clay cap will be installed, and the electrical systems will be installed for all off-site area wells.

SVE System: The Request for Proposal will be sent out.

6. Next Weekly Construction Meeting

The next meeting is scheduled for Thursday, June 7, 2001

TMK/PJV/TAL
J:\209\0601 ACS\0202 MWA PM\6010202a034.doc

05/31/01

ACS NPL Site
Drum Removal: Areas A and B

Total drums removed: 1698

Total Overpacked drums: 249

Total Crushed drums to rolloff: 1449

Total quantity of soil to firepond: 2496 yd^3

Cubic Yards per Load: 6.5

Date	Drums Overpacked	Drums Crushed to rolloff	Loads of Debris to Fire pond	Cubic Yards		Drums Sampled	Samples Analyzed
Area A							
4/27/01	10	74	11	71.5		0	0
4/30/01	15	104	13	84.5		10	0
5/1/01	13	59	8	52		15	4
5/2/01	8	96	9	58.5		13	8
5/3/01	4	72	19	123.5		0	13
5/4/01	0	0	30	195		12	0
5/7/01	29	96	11	71.5		0	13
5/8/01	19	92	19	123.5		29	12
5/9/01	30	144	36	234		19	29
5/10/01	9	211	30	195		30	19
5/11/01	0	74	32	208		9	21
5/14/01	0	0	15	97.5		0	18
5/15/01	0	0	0	0		0	0
Subtotal A	*137*	*1022*	*233*	*1514.5*		*137*	*137*
Area B							
5/16/01	0	0	50	325		0	0
5/17/01	12	68	1	6.5		0	0
5/18/01	24	95	38	247		36	0
5/21/01	42	100	9	58.5		24	6
5/22/01	21	88	27	175.5		23	22
5/23/01	13	76	18	117		29	18
5/24/01	0	0	0	0		0	16
5/29/01	0	0	0	0		0	26
5/30/01	0	0	8	52		0	24
Subtotal B	*112*	*427*	*151*	*981.5*		*112*	*112*
Grand Total	**249**	**1449**	**384**	**2496**		**249**	**249**

(128) Margaret E. Mulkerrin 05/03/01

700 ARRIVE at site. Weather: 70°F Sunny. Daily morning safety meeting conducted by Maureen Handler of KES - reviewed equipment safety, daily work schedule, confined space procedures. KES has a new member onsite - Maureen will go over site Health & Safety with him after the meeting.

800 TopFlight continues ORC injection in the south area. Per Stela Williams of M.W., there are approx. 150 holes, with 87 holes complete. May need an additional 2-3 days to complete work.

900 Koester & M.W. ~~that~~ replace pump in EW18 in onsite area. Air monitoring was performed by M.W.

PERSONNEL PRESENT

Lee Orosz	MWCT
Jerry Clark	Ryan
Tracy Webber	KES
Matt Grostick	MWA
Steven Wolcott	KES
Bret Keller	KES
Etienne Camel	KES
Jamie Bergeron	KES
RJ Futrell	KES

Margaret E. Mulkerrin

(129) Margaret E. Mulkerrin 05/03/01

PERSONNEL PRESENT (cont.)

Maureen Handler	KES
Travis Klingforth	MWA
Larry Campbell	BVSPC
Margaret Mulkerrin	BVSPC
Todd Lewis	MWCT
Peter Vagt	MWA
Stela Williams	MWA
Mack Clark	TopFlight
Brian Weaver	TopFlight
Tom Tinics	MWCT
David Higgins	US Filter
Michael Mateyka	MTI
Barbara Majel	K+W

1000 Construction progress meeting in Montgomery Watson construction trailer. Meeting notes & agenda in file.

1130 Koester performing drum excavation in Area 'A'

1145 Spoke with Maureen Handler of KES on laboratory equipment, procedures, and types of sampler she had tested. Maureen stated that most samples were oil based paint, solvents (most not chlorinated, two samples were chlorinated solvents).

Margaret E. Mulkerrin

(130) Margaret E. Mulkerrin 05/03/01

+ petroleum products.

PICTURE 4 ROLE 8

Facing north - picture of drum carcasses being placed into roll off box in area "A" Air monitoring being performed in back-ground by MW

1200 LUNCH

1300 Koester putting drum carcasses in roll-offs, getting ready to begin back-filling area 'A'

1330 Spoke with Pete Vagt regarding concern that people were entering exclusion zone in the morning to prepare equipment + have no foot/shoe protection to prevent tracking contaminated soils out of the area. Also inquired about air monitoring + safety concerns at the firepond. Pete stated that ACS is responsible for air monitoring at the firepond.

PICTURE 5 ROLE 8

Facing north - picture of drums being placed on staging pad.

1400 Spoke with Matt Grostick about air monitoring procedures. Matt air

Margaret E. Mulkerrin

(131) Margaret E. Mulkerrin 05/03/01

monitors approx. every two hours around exclusion zone perimeter. He did monitor ~~inside the~~ main around the firepond today as well, but does not do that on a regular basis.

PICTURE 6 ROLE 8

Facing north - excavation complete ~~as~~ main that far for area 'A'

PICTURE 7 & 8 ROLE 8

Facing South - picture of firepond

Picture 7 - outfall & free product

Picture 8 - overall view of firepond

Matt entered inside fence surrounding the exclusion zone, staying on the perimeter, to perform air monitoring, without PPE. When questioned, Matt stated the "technical" exclusion zone is only 50' outside the excavation, & he stayed further away than that.

1530 Leave site.

Margaret E. Mulkerrin

05/03/01

Margaret E. Mulkerrin

(132) Margaret E. Mulkerrin 5/00/01

7:15 ARRIVE ON SITE. WEATHER: SUNNY, 65°F

PICTURE 9 ROLL 8

EXCAVATION IN AREA A ON 5/8/01 FACING NORTH

7:45 BACKFILL WAS DELIVERED INTO EXCLUSION ZONE. DRIVER, NOT WEARING PPE, GOT OUT OF TRUCK, PARKED NEAR STAGING PAD WHERE SAMPLING WAS OCCURRING. I SPOKE W/ MATT GROSTICK ABOUT THIS BEHAVIOR. MATT IMMEDIATELY SPOKE W/ JAMIE BERGON & TOLD HIM THAT SAMPLING & EXCAVATION CANNOT BE OCCURING WHEN FILL IS BEING DELIVERED. I ALSO TOLD MATT THAT HE SHOULD STAY OUTSIDE THE FENCED AREA WHEN PERFORMING AIR MONITORING, UNLESS HE WEARS PPE, WHETHER OR NOT IT IS THE "TECHNICAL" EXCLUSION ZONE. I STATED ANYTHING W/ IN THE FENCE SHOULD BE CONSIDERED EXCLUSION ZONE.

PICTURE 10 ROLE 8

FACING NORTH SAMPLING OF OVERPACKED DRUMS IN AREA 'A'.

PICTURE 11 ROLE 8

FACING NORTH. MATT GROSTICK IN AREA 'A'

NOTE: NO SAMPLING OR EXCATION OCCURRING,

Margaret E. Mulkerrin

(134) Margaret E. Mulkerrin 05/08/01

BUT, SAMPLING OF DRUMS WAS GOING ON 10 MINUTES PRIOR. MATT WALKED THROUGH THE AREA W/ PID, BUT NOT WEARING PPE. I HAD DISCUSSED W/ HIM PRIOR TO THIS ABOUT WEARING PPE WHEN INSIDE FENCED AREA.

845 EXCAVATION YESTERDAY & TODAY REQUIRED MOVING THE EXCLUSION ZONE TO THE SOUTH FURTHER, INCORPORATING THE ONSITE ROAD. ROLL OFF BOXES WERE DELIVERED THIS MORNING.

9:00 AM BOOTIES ARE BEING WORN TODAY W/IN EXCLUSION ZONE

1000 ORC INJECTION CONTINUES IN THE SOUTH AREA. NOW COMPLETING THE AREA IN THE SOUTHEAST CORNER OF THE SOUTH OFFSITE AREA. THERE WERE EIGHT ORC HOLES THAT, UP UNTIL NOW, WERE NOT LOCATED. P. VAGT & S. WILLIAMS MARKED THEM OFF IN THE SOUTH OFFSITE AREA. S. WILLIAMS ANTICIPATES THE ORC INJECTION TO BE COMPLETE TOMORROW.

PERSONNEL PRESENT

LEE OROSZ MWCI
MATT GROSTICK MWA
BRET KELLER KES
STEVEN WOLCOTT KES
ETIENNE CAMEL KES

Margaret E. Mulkerrin

(135) Margaret E. Mulkerrin 05/08/01

MAUREEN HANDLER	KES
JANICE BERGERON	KES
RJ FUTRELL	KES
ALEX ELLWOOD	MWA
MARGARET MULKERRIN	BVSPC
STELA WILLIAMS	MWA
BRIAN WEAVER	TOP FLIGHT
MACK CLARK	TOP FLIGHT
TRACY WEBER	150/KES
TODD LEWIS	MWCI
TOM TINICS	MWCI
ROBERT ADAMS	MWA

(1400) PICTURE 12 ROLE 8
REMOVED DRUM BEING PLACED IN OVERPACK IN AREA 'A', FACING NORTH.
(1405) PICTURE 13 ROLE 8
REMOVED DRUM BEING PLACED IN OVER-PACK IN AREA 'A', FACING NORTH.
1100 SPOKE WITH TOM TINICS. EW 18 WAS NOT FUNCTIONING PROPERLY BECAUSE IT WAS CONNECTED TO THE WRONG LINE WHEN INSTALLED. M.W. WAS ABLE TO IDENTIFY THE PROBLEM & ARE WORKING ON A SOLUTION. TOM STATED THAT LEE OSORZ DOES NOT BELIEVE

Margaret E. Mulkerrin

(136) Margaret E. Mulkerrin 05/08/01

THAT EW20 IS FUNCTIONING PROPERLY. THE BYPASS FOR THE FIREPOND EFFLUENT WAS OPENED TODAY ALLOWING THE FIREPOND TO DRAIN DIRECTLY TO THE BIOREACTOR. THIS WAS NEEDED UNTIL NEW CARBON COULD BE INSTALLED IN THE PLANT. THE SPOILS MANAGEMENT & REGRADING SHOULD START IN A FEW WEEKS. PCB SOILS REMOVAL SHOULD START IN LATE SUMMER.
1400 LOESTER STARTED EXCAVATING. MORNING ACTIVITIES INCLUDED RECEIVING NEW ROLL OFF BOXES, BACKFILLING, AND SAMPLING DRUMS FROM YESTERDAYS EXCAVATION
1500 LEAVE SITE

Margaret E. Mulkerrin
May 08, 2001

Margaret E. Mulkerrin

7:15 am ARRIVE ONSITE. WEATER: 65°F, RAIN ENDING, PARTLY CLOUDY. MORNING HEALTH & SAFETY MEETING CONDUCTED BY MAUREEN HANDLER. SHE DISCUSSED THE UPCOMING RECONFIGURATION OF THE EXCLUSION ZONE AS THE REMOVAL IN AREA 'A' COMES TO AN END & AREA 'B' BEGINS. MONTGOMERY WATSON STATED THAT THE OPERATORS & SAFETY PERSONNEL (RJ FUTRELL) WOULD BE ALLOWED TO WEAR TYVEK SUITS DUE TO THE RISING TEMPS. ALL WORKERS WHO COME IN DIRECT CONTACT MUST CONTINVE TO WEAR THE PVC SUITS. MATT GROSTICK WILL PREPARE AN ADDENDUM TO THE HEALTH & SAFETY PLAN TO INCORPORATE THIS CHANGE.

8:00 SPOKE WITH PETE VAGT. ORC INJECTION WAS COMPLETED YESTERDAY. PETE EXPECTS TO BEGIN EXCAVATION IN AREA 'B' BY NEXT TUESDAY.

9:20 PICTURE 14 ROLE 8
FACING NORTH IN ONSITE AREA. KOESTER ~~SAMPLING~~ men TESTING OVERPACKED DRUMS ON DRUM STAGING PAD.

9:21 PICTURE 15 ROLE 8

Margaret E. Mulkerrin

FACING NORTH IN ONSITE AREA. KOESTER SAMPLING DRUMS ON DRUM STAGING PAD.

930 DISCUSSED WITH MATT GROSTICK THE IMPORTANCE OF FOLLOWING PROCEDURE WHEN DOWNGRADING THE SITE ~~TODAY~~ men FROM LEVEL B TO ALLOW FOR NON INTRUSIVE ACTIVITIES TO TAKE PLACE WITHOUT PPE (LEVEL B). AIR MONITORING NEEDS TO BE DONE & EVERYONE NEEDS TO ALWAYS BE AWARE OF THE STATUS OF THE EXCLUSION ZONE.

10:00 WEEKLY CONSTRUCTION PROGRESS MEETING: (AGENDA IN FILE).

- REVISION TO THE HASP WILL BE DISTRIBUTED NEXT WEEK. THIS COVERS ALLOWING LIMITED PERSONNEL TO WEAR TYVEK INSTEAD OF PVC SUITS.
- PRODUCTION: AS OF 5/09 - 128 INTACT DRUMS OVERPACKED, 737 NON INTACT PLACED IN ROLL OFFS, 98 DRUMS SAMPLED, 71 ANALYZED, 1016 YD^3 OF SOIL PLACED IN FIREPOND.
- 17 ROLL OFFS ONSITE. EIGHT ARE FULL. TODD LEWIS STATED A METHOD SHOULD BE INSTITUTED WHICH WILL TRACK WHEN THE BOXES ARE FILLED, AND WHAT IS IN THEM. MATT GROSTICK DISCUSSED THE DAILY INSPECTIO

Margaret E. Mulkerrin

OF THE ROLL OFFS, AND THAT HE WILL DEVELOP A PLAN FOR WEEKLY INSPECTIONS ONCE THE ACTIVE WORK CEASES.

- MAUREEN EXPECTS TO COMPLETE AREA 'A' THIS WEEK, & BEGIN EXCAVATING AREA 'B' BY TUES.
- MAUREEN IS COMPILING INFO. ON SAMPLED DRUMS. SHE IS SEPARATING THE STAGED DRUMS INTO THE FOLLOWING GROUPS: CHLORINATEDS, ~~AED~~ MEN FLAMMABLES, NON FLAMMABLES, PARAFINS, OILS, HOLD (NEED FURTHER TESTING.)
- KES SUBMITS A DAILY REPORT OF HAZCAT ANALYSIS TO MW (ALEX)
- TODD LEWIS WOULD LIKE BETTER TRACKING OF ROLL OFF BOXES, & WANTS TO INVESTIGATE RCRA REQUIREMENTS FOR DRUM LABELING
- MON. WILL RECONFIGURE EXCLUSION ZONE, AVSTGEN LOOKING AT OVERHEAD LINES & REQUIRED PROTECTION. WILL DISCUSS W/ ACS THE PROCEDURES SHOULD A POWERLINE BE HIT OR DAMAGED.
- THE CARBON IN THE TX PLANT IS BEING REPLACED TODAY. THE TX PLANT IS CURRENTLY IN A RECYCLE MODE, BUT WILL BE BACK ONLINE IN THE NEXT DAY OR SO.
- EW 18 REPAIRED & ONLINE; EW 10 IS

Margaret E. Mulk

ONLINE, EW20 IS ONLINE, BUT MAY NOT BE FULLY DEVELOPED. PLAN ON TELEVISING EW20 SOMETIME NEXT WEEK.

- SILT FENCE & SED BASIN SHOULD BEGIN TO BE DONE NEXT WEEK.
- WILL BE IMPORTING CLAY IN THE NEXT TWO WEEKS FOR SOUTH OFFSITE.
- OXIDIZER NO. 1 WILL BE ORDERED NEXT WK. FOR INITIAL DEPLOYMENT.
- 1-2 WEEKS THE RFB WILL BE COMPLETE FOR THE ISVE WELLS.
- MW-W1 (IN SAME VICINITY AS MW-4D) WAS SAMPLED. CONTAINED BENZENE. WILL BE ABANDONED (VERBAL APPROVAL FROM IDEM) IN A FASHION SIMILAR TO MW4D. MW-55 WILL SERVE ITS FUNCTION.
- M.E.M. RE ITERATED THE IMPORTANCE OF KEEPING THE STATUS OF THE EXCLUSION ZONE CLEAR, & FOLLOWING PROPER PROCEDURES FOR DOWNGRADING THE AREA FROM B TO D.

END OF MEETING NOTES

1130 PICTURE 1 ROLL 9

FACING EAST IN ONSITE AREA. DRUM EXCAVATION IN AREA 'A' DRUMS WAITING

Margaret E. Mulkerrin

(141) Margaret E. Mulkerrin 05/10/01

TO BE PLACED IN OVERPACKS. (NOTE LEAKAGE FROM DRUMS).
1445 LEAVE SITE.

Margaret E. Mulkerrin
May 10, 2001

Margaret E. Mulkerrin

(142) Margaret E. Mulkerrin 5/14/01

715 ARRIVE ONSITE. WEATHER: PARTLY CLOUDY, BREEZY, 60°F. DAILY SAFETY MEETING IN PROGRESS.
730 CLEAN FILL IS DELIVERED. THE DAILY PLAN IS TO COMPLETE THE BACKFILLING OF AREA 'A' MAKING SURE ALL VISUALLY CONTAMINATED SOIL & DRUM DEBRIS ARE REMOVED, RECONFIGURE THE EXCLUSION ZONE TO INCORPORATE AREA 'B', MID-AMERICAN DRILLING WILL BE ONSITE TODAY TO ABANDON MW W-1 IN THE N.W. CORNER OF THE ONSITE AREA.
900 KES BACKFILLING AREA 'A' WITH CLEAN FILL ONCE TRAVIS KNINGFORTH OF MW INSPECTS TO MAKE SURE VISABLY CLEAN.
1000 MIDAMERICA DRILLING WORKING ON ABANDONING MW-W1 UNDER THE SUPERVISION OF CHAD SMITH. THEY PLAN ON PLACING AN 8" CASING AROUND THE WELL, FILLING THE INSIDE OF THE WELL, & THE INSIDE & OUTSIDE OF THE CASING WITH BENTONITE SLURRY. THE WELL WILL REMAIN IN PLACE (ALLOWED IN THE STATE OF INDIANA).
1300 KOESTER CONTINUES TO BACKFILL AREA 'A' UNDER THE DIRECTION OF MONTGOMERY WATSON.

Margaret E. Mulkerrin

(143) Margaret E. Mulkerrin 5/14/01

1330 MIDAMERICAN DRILLING CONTINUES WORK ON ABANDONING MW-W1 IN A FASHION SIMILAR TO MW-4D.

1335 LEAVE SITE.

Margaret E. Mulkerrin
May 14, 2001

Margaret E. Mulkerrin

(144) Margaret E. Mulkerrin 5/17/01

0715 ARRIVE ONSITE. WEATHER: RAINY, 70°F.
0800 SPOKE W/ MAUREEN HANDLER OF KES. BEGAN TO DIG IN AREA 'B' ON TUESDAY. EXCAVATED AROUND BUILDING TO DETERIMINE WHETHER DRUMS WERE UNDER THE CONCRETE PAD OR BUILDING. NO DRUMS WHERE PRESENT, SO THEY BACKFILLED THE AREA.
1000 WEEKLY CONSTRUCTION PROGRESS MEETING:
- AIR MONITORING RESULTS WERE SENT TO THE EPA YESTERDAY!
- MEI + COLLINS REC'D H+S ORIENTATION BY M. GROSTICK THIS MORNING
- MEI WILL SUBMIT DAILY AIR MONITORING RESULTS TO MONTGOMERY WATSON.
- COMPLETE AREA 'A' TOTALS ARE LISTED ON MEETING AGENDA.
- ALL POWER LINES HAVE TAGGED + SHUT OFF IN AREA 'B'!
- WATER LINE IN AREA 'B' IS MARKED.
- MAYBE DONE EXCAVATING DRUMS FROM AREA 'B' BY THE END OF NEXT WEEK.
- COLLINS + MEI ARE WORKING IN SOUTH OFF-SITE AREA TO INSTALL THE TEMP. COVER + SED. BASIN.
- BEGINING TO DIG SED. BASIN, WILL THEN LAY GEOTEXTILE + RIP RAP.

Margaret E. Mulkerrin

(145) Margaret E. Mulkerrin 05/17/01

- EROSION CONTROL WILL BE INSTALLED NEXT WEEK.
- MEI WILL THEN DISTRIBUTE CONTENTS OF IDW DRUMS, & SPOILS PILE; REGRADE THE AREA.
- THE INTERIM CAP IS TO BE 12" CLAY; FINAL IS TO BE 6" MORE W/ ENGINEERED LAYER. MAY GO TO FINAL CAP STATUS IN THE NON-ENGINEERED AREAS (SEE RA FOR SPECIFICS)
- EXISTING PIEZOMETERS MAY BE ABANDONED & NEW ONES INSTALLED WHEN CAP IS COMPLETE. THE PIEZOMETERS IN THE OFFSITE AREA WILL BE ABANDONED PER IDEM REQUIREMENTS.
- GWTP WILL BEGIN DISCHARGING AGAIN TODAY.
- MW-W1 WAS ABANDONED. NO CASING WAS PRESENT.

END OF MEETING NOTES

PERSONNEL PRESENT

RJ FUTRELL	KES
ETIENNE CAMAL	KES
STEVEN WOLCOTT	KES
TRACY WEBER	ISO/KES
TOM TINICS	MWCI
TODD LEWIS	MWCI

Margaret E. Mulkerrin

(146) Margaret E. Mulkerrin 05/17/01

MATT GROSTICK	MWA
STEPHEN FITZGERALD	RW COLLINS
STEVE McDONALD	RW COLLINS
TOM LAYDEN	RW COLLINS
RICK HARTMANN	RW COLLINS
TOM COOK	RW COLLINS
KEN FIELD	MEI
MAUREEN HANDLER	KES
JAMIE BERGERON	KES
ALEX ELLWOOD	MWA
MARGARET MULKERRIN	BVSEC
~~FRAC~~ INSTA RICH FLORES	AUSTGEN
MIKE CHENOWETH	SIMALABS
JOE WILLICH	MWCI
PETE VAGT	MWCI

1300 SPOKE WITH KEN FIELD REGARDING THE ACTIVITIES OCCURING IN THE SOUTH OFF-SITE AREA. THE EXCAVATION OF THE SEDIMENTATION BASIN HAS BEGUN, AS WELL AS THE SHEARING & EMPTYING OF THE IDW ~~WELLS~~ DRUMS INSTA. KEN DID NOT RECOMMEND BRINGING ANY CLAY ONTO THE SITE UNTIL THE GRADING IS COMPLETE. KEN EXPECTS HIS ACTIVITIES TO CONTINUE FOR ANOTHER COUPLE OF WEEKS.

1200 AFTER COMPLETION OF CONSTRUCTION

Margaret E. Mulkerrin

(47) Margaret E. Mulkerrin 05/17/01

1200 (cont) MEETING, PETE VAGT SPOKE WITH ME REGARDING THE QUALITY OF M.W. PERFORMANCE. HE ASKED IF I HAD ANY CONCERNS OR QUESTIONS I WOULD LIKE TO RAISE W/ HIM IN PRIVATE, NOTING THE RECENT DISSATISFACTION WITH THE ATTITUDE OF SOME OF MW PERSONNEL. I TOLD PETE THAT I HAVE RECEIVED ACCEPTABLE RESPONSES TO MOST OF MY RECENT CONCERNS, + HAD NOTHING ADDITIONAL TO ADD RIGHT NOW.

1345 DRUM EXCAVATION HAD CEASED. KES IS WORKING ON REMOVING SOIL/MUD OUT OF THE EXCAVATION.

1430. LEAVE SITE.

Margaret E. Mulkerrin
May 17, 2001

Margaret E. Mulkerrin

(48) Margaret E. Mulkerrin 05/22/01

0720 ARRIVE ON SITE. WEATHER: SUNNY, 60°F. MORNING SAFETY MEETING JUST ENDING - TOPIC: SLIP, TRIPS + FALLS. ACTIVITIES ONSITE TODAY: CONTINUED DRUM REMOVAL IN AREA 'B'; IDW DRUM + SPOILS MANAGEMENT IN OFFSITE AREA; SAMPLE ORC WELLS.

0750 PICTURE 2 ROLL 9
FACING NORTHWEST - PICTURE OF EXCAVATION IN AREA 'B'.

845 SPOKE WITH KEM FIELD OF ME1 - IDW DRUMS HAVE BEEN SHEARED + CONTENTS EMPTYIED. HAVE MADE GOOD PROGRESS ON DETENTION POND. WAITING FOR MW TO GIVE THEM AN ELEVATION SO THEY CAN FINE GRADE IT. THE OUTLET WILL BE TWO 8" PIPES. AN OVERFLOW WILL ALSO BE PROVIDED. CURRENTLY ALSO WORKING ON SHEARING MAT'L FROM KP BUILDING.

900 PICTURE 3 ROLL 9
FACING NORTH. RW COLLINS EXCAVATING DETENTION POND.

910 PICTURE 4 ROLL 9
FACING SOUTH. RW COLLINS WORKING ON SHEARING MAT'L. IN SOUTH OFFSITE AREA.

940 KES CONTINUES DRUM REMOVAL ACTIVITIES IN AREA 'B'.

Margaret E. Mulkerrin

(150) Margaret E. Mulkerrin 05/22/01

950 PICTURE 5 ROLL 9
FACING NORTHWEST. KES EXCAVATING AREA B. DRUMS EMITTING ORANGE RESIDUE.
955 PICTURE 6 ROLL 9
FACING NORTHWEST. KES PLACING DRUM IN OVERPACK IN AREA 'B'.
1000 PICTURE 7 ROLL 9
KES SAMPLING DRUMS ON STAGING PAD.
1010 PERSONNEL PRESENT ON SITE
LEE OROSZ MWCI
KEN FIELD MET
STEVE FITZGERALD RW COLLINS
TOM LAYDEN RW COLLINS
RICK HARTMANN RW COLLINS
MAUREEN HANDLER KES
STEVEN WOLCOTT KES
MATT GROSTICK MWA
BRET KELLER KES
RJ FUTRELL KES
JAMIE BERGERON KES
TRAVIS KLINGFORTH MWA
ALEX ELLWOOD MWA
MARGARET MULKERRIN BVSPC
PETE VAGT MWA
CHAD SMITH MWA

Margaret E. Mulkerrin

(151) Margaret E. Mulkerrin 05/22/01

RUDY STEIN MWA
TODD LEWIS MWCI
TRACY WEBER ISO
KEN DICKOVER SECURITY FENCE
WALTER J. JANAKA SECURITY FENCE
BILL PEPIN SECURITY FENCE
TOM TINICS MWCI
END OF PERSONNEL
SPOKE WITH PETE VAGT THIS MORNING. HE SAID THAT HE SENT A DOCUMENT DESCRIBING THE DELINEATION OF THE DRUM REMOVAL AREAS TO BVSPC OFFICE. HE ALSO STATED THAT MW WILL BE LOCATING THE MONITORING WELLS IN THE ORC PILOT STUDY USING GPS. SEAN GRADY OF IDEM REQUESTED THAT THE LOCATIONS BE VERIFIED SINCE THEY HAVE CHANGED FROM THE PROPOSED LOCATIONS IN THE WORK PLAN.
1100 PICTURE 8 ROLL 9
FACING NORTHWEST. PICTURE OF FIREPOND.
1100 PICTURE 9 ROLL 9
FACING SOUTHEAST. PICTURE OF FIREPOND.
1130 CHAD SMITH & RUDY STEIN HAVE BEGAN SAMPLING ORC PIEZOMETER 104.
1135 PICTURE 10 ROLL 9

Margaret E. Mulkerrin

(152) Margaret E. Mulkerrin 05/22/01

FACING WEST. SMITH & STEIN SAMPLING ORC WELL 104 SOUTHEAST CORNER OF REDER & COLFAX.

1140 SPOKE WITH PETE VAGT RE. WELL IN MIDDLE OF SEDIMENTATION BASIN. VAGT STATED THAT THEY PLAN ON PULLING THE WELL & FILLING THE HOLE W/ BENTONITE SLURRY. PETE SAID THE WATER IS 2' BELOW GROUND SURFACE RIGHT NOW, THE WELL IS 13' DEEP, & THE CLAY IS 15' THICK. PETE SAID THEY KNOW THE WELL IS FOR THE UPPER AQUIFER.

1300 KES IS EXCAVATING DRUMS & DAMAGING SEVERAL, CAUSING THE CONTENTS TO SPILL. PETE VAGT OF MWA STOPPED THE WORK & MATT GROSTICK INFORMED KES THAT THEY NEEDED TO BE MORE CAREFUL- ~~from~~ IT WAS SUGGESTED THAT THEY PUT A MAN IN THE HOLE TO HANDLE THE DRUMS - AS THEY CURRENTLY ONLY HAD THE OPERATOR TO REMOVE THEM, AND ONE PERSON TO PLACE THE DRUM IN AN OVERPACK. THE WORKED STOPPED & KES PERSONNEL HELD A MEETING. MW STRESSED THE NEED FOR MORE CAUTION WHEN HANDLING THE DRUMS.

Margaret E. Mulkerrin

(153) Margaret E. Mulkerrin 05/22/01

1400 WORK RESUMED. THEY ARE NOT EXCAVATING ANY ADDITIONAL DRUMS TODAY. NOW, THE NON-INTACT DRUMS ARE BEING PLACED IN ROLL-OFF BOXES.

1405 FACING NORTHWEST. PICTURE OF AREA 'B' EXCAVATION. THE WHITE RESIDUE IS THE RESULT OF THE AFOREMENTIONED PUNCTURED DRUMS.

1430 LEAVE SITE. (PICTURE 11 ROLL 9)

Margaret E. Mulkerrin May 22 2001

Margaret E. Mulkerrin

(154) Margaret E. Mulkerrin 05/24/01

715 ARRIVE ONSITE. WEATHER: PT. CLOUDY 60°F SPOKE WITH MATT GROSTICK OF M.W. - DRUM REMOVAL WAS COMPLETED YESTERDAY IN AREA 'B' KES STILL HAS CLEANUP & BACKFILLING TO DO. 800 / IN SOUTH OFFSITE AREA, MEI & RW COLLINS CONTINUES WORK. TODAY, THEY ARE RAISING 5 MANHOLES TO ADJUST FOR THE RAISE IN GRADE WHEN THE CAP IS INSTALLED.
1130 WEEKLY CONSTRUCTION MEETING. NOTES TO FOLLOW.
1236 MATT GROSTICK, PETE VAGT & I TOOK A LOOK AT THE EXCAVATION IN AREA 'B' TO LOOK FOR SIGNS OF REMAINING DEBRIS. MATT WENT OVER THE AREAS THAT WERE EXCAVATED & EXPLAINED THAT IT WAS DONE PER THE GEOPHYSICAL FOOTPRINT.
1245 PICTURES 12-15
EXCAVATION IN AREA B. NO DRUMS APPEAR TO REMAIN. KES WILL RETURN TO SITE ON WEDNESDAY TO DEWATER, REMOVE ANY VISUALLY & CONTAMINATED SOIL, & BACKFILL.
B5 PICTURE 1 ROLL 10
IN OFFSITE AREA. RW COLLINS PLACING MATERIAL FROM KP BUILDING
1330 PICTURE 2 ROLL 10

Margaret E. Mulkerrin

(155) Margaret E. Mulkerrin 05/24/01

FACING NORTH IN SOUTH OFFSITE AREA. MEI & RW COLLINS PLACING ADJUSTING RING ON M.H.
1345 MONTGOMERY WATSON ATTEMPTED TO PUT A CAMERA DOWN EW20 TO INVESTIGATE THE REASON THE WELL HAS NOT DEVELOPED AS EXPECTED. THE WORK WAS DELAYED DUE TO RAIN.
1430 LEAVE SITE.

WEEKLY MEETING NOTES

- RADIATION MONITORING WAS PERFORMED ON DRUMS & ROLL OFF BOXES. RESULTS WERE CLEAR.
- OFFSITE WORK:
  - STONE WILL BE BROUGHT IN FOR DET. POND.
  - AIR MONITORING IS DONE PERIODICALLY. INITIALLY, MONITORING WAS CONSTANT & WORK WAS DONE IN LEVEL C. NO HITS ON ANY MONITORING THUS FAR.
  - M.W. HAS NOT REVD MONITORING LOGS FROM MEI FOR THE PAST FEW DAYS. MEI WILL SEND THEM.
- AREA B - DRUM REMOVAL COMPLETE. EXCAVATION STILL OPEN. WILL CLEAN OUT NEXT WEEK.
- MAUREEN CONTINUES HAZCAT ANALYSIS - 5 CATEGORIES: CHLORINATED, FLAMMABLE, PARAFIN, NON (HAZ./FLAM.), OIL, CHLORINATED PARAFINS.

Margaret E. Mulkerrin

(156) Margaret E. Mulkerrin 05/24/01

- WILL BEGIN TO DEMOB. EMPTY ROLLOFFS & STAGE FULL ONES IN THE UPCOMING WEEKS. INQUIRY TO EPA ON RCRA REQUIREMENTS RE: ROLLOFFS.
- OFFSITE: REMAP EX. CLAY TO DECIDE IF IT CAN BE STOCKPILED FOR UPCOMING CAP.

END OF MEETING NOTES

Margaret E. Mulkerrin
May 24, 2001

(157) Margaret E. Mulkerrin 05/30/01

0730 ARRIVE ONSITE. WEATHER: SUNNY, 60°F, LIGHT WIND FROM THE NORTH.

KOESTER STOCKPILING FILL FOR AREA 'B' EXCAVATION. TODAY, KES WILL REMOVE ANY REMAINING VISABLY CONTAMINATED SOIL FROM EXCAVATION & BEGIN TO BACKFILL. SPOKE W/ MATT GROSTICK REGARDING ROLL-OFF BOXES. HE STATED THAT KES MAY SORT CONTENTS OF BOXES - CLASSIFY INTO GROUPS, SAMPLE ETC. BUT A FINAL DECISION HAS NOT BEEN MADE.

0830 IN OFCA - SPOKE W/STEVE FIELD OF MET. GRADING THE VOC PILE TODAY. CONTINUE TO FINISH UP DETENTION POND (PLACE RIP RAP). MOST OF THE DEBRIS FROM THE K-P BUILDING HAS BEEN MAP & PLACED IN THE DESIGNATED AREA (NORTH-CENTRAL PORTION OF THE SITE). SOME DEBRIS REMAINS, THE DESIGNATED AREA IS FULL. WILL LOOK TO MONTGOMERY WATSON FOR DIRECTION.

0840 PICTURE 3 ROLL 10
FACING NORTHWEST. PHOTO OF DETENTION POND OUTLET STRUCTURE.

0845 PICTURE 4 ROLL 10
FACING SOUTHEAST. PHOTO OF RW COLLINS REGRADING VOC PILE IN OFCA.

Margaret E. Mulkerrin

(158) Margaret E. Mulkerrin 05/30/01

850 PICTURE 5 ROLL 10
FACING SOUTH. METAL DEBRIS ON OFCA.
900 PICTURE 6 ROLL 10
FACING SOUTHEAST. PHOTO OF REGRADED PCB SPOILS PILE IN OSCA.
SPOKE W/ TOM TINICS. RW COLLINS WILL DO SOME REGRADING OF OFFSITE AREA TO ENCOURAGE DRAINAGE TO THE DETENTION POND. THEY WILL DEVELOP THE APRONS, USING RIP RAP, OF THE DET. POND. ALL MANHOLES WERE RAISED.
ALSO, CHRIS DALY OF MONTGOMERY WATSON IS ~~ONSITE~~ NOW WORKING IN THE OFFSITE AREA TO DEVELOP A MAP OF THE REMAINING CLAY FROM THE PREVIOUS CAP.

PERSONNEL ONSITE:

LEE OROSZ	MWCI
JAMIE BOERGERON	KES
RJ FUTRELL	KES
ET CAMEL	KES
STEVEN WOLCOTT	KES
MATT GROSTICK	MWA
STEVE FIELD	MEI
MAUREEN HANDLER	KES
CHRIS DALY	MWA
MARGARET MULKERRIN	BVSPC

Margaret E. Mulkerrin

(159) Margaret E. Mulkerrin 05/30/01

TOM TINICS MWCI
TRACY WEBER KES/1350
PHOTO 7 ROLL 10
FACING SOUTHEAST. PICTURE OF FIREPOND.
1300 PHOTO 8 & 9 ROLL 10
FACING NORTH PHOTO OF KES EXCAVATING WHILE ANOTHER EMPLOYEE IS BACKFILLING W/O PPE.
SPOKE W/ MATT GROSTICK & JAMIE BERGERON. ABOUT ABOVE PICTURE. BY THAT TIME THE OPERATOR HAD COME OUT OF THE EXCLUSION ZONE. GROSTICK STATED HE WILL TALK TO KES.
1310 BACKHOE OPERATOR STOPPED EXCAVATING, BUT BEGAN BACKFILLING WHILE TRUCKS DELIVERED CLEAN FILL. THEN BACKHOE OPERATOR REMOVED PPE & GOT OUT OF MACHINE. NO DOWNGRADING OF EXCAVATION OCCURRED.
1320 SPOKE WITH MATT GROSTICK ABOUT PROPER PROCEDURES FOR DOWNGRADING EXCLUSION ZONE. ALSO TOLD HIM SOME PEOPLE HAD ENTERED ZONE WITHOUT BOOTIES TODAY. TOLD MATT THAT EXCLUSION ZONE PROCEDURES MUST BE FOLLOWED UP THROUGH JOB COMPLETION.
1400 TOOK A LOOK AT SOUTH OFFSITE AREA. ALL DEBRIS FROM KP BUILDING HAS BEEN MOVED TO THE DESIGNATED AREA. SOME GRADING IS

Margaret E. Mulkerrin

(160) Margaret E. Mulkerrin 05/30/01

OCCURRING ALONG THE NORTH EDGE OF THE AREA TO PROMOTE DRAINAGE TO POND. PCB + SVOC PILE HAVE BEEN GRADED DOWN.

I445 LEAVE SITE.

END OF BOOK 12

Margaret E. Mulkerrin
May 30, 2001

Margaret E. Mulkerrin

CURVE TABLES

HOW TO USE CURVE TABLES

Table I. contains Tangents and Externals to a 1° curve. Tan. and Ext. to any other radius may be found nearly enough, by dividing the Tan. or Ext. opposite the given Central Angle by the given degree of curve.

To find Deg. of Curve, having the Central Angle and Tangent: Divide Tan. opposite the given Central Angle by the given Tangent.

To find Deg. of Curve, having the Central Angle and External: Divide Ext. opposite the given Central Angle by the given External.

To find Nat. Tan. and Nat. Ex. Sec. for any angle by Table I.: Tan. or Ext. of twice the given angle divided by the radius of a 1° curve will be the Nat. Tan. or Nat. Ex. Sec.

EXAMPLE

Wanted a Curve with an Ext. of about 12 ft. Angle of Intersection or I. P. = 23° 20′ to the R. at Station 542 + 72.

Ext. in Tab. I opposite 23° 20′ = 120.87
120.87 ÷ 12 = 10.07. Say a 10° Curve.

Tan. in Tab. I opp. 23° 20′ = 1183.1
1183.1 ÷ 10 = 118.31.

Correction for A. 23° 20′ for a 10° Cur. = 0.16
118.31 + 0.16 = 118.47 = corrected Tangent.

(If corrected Ext. is required find in same way)
Ang. 23° 20′ = 23.33° ÷ 10 = 2.3333 = L. C.

2° 19½′	= def. for sta.	542	I. P.	= sta.	542 + 72
4° 49½′	= " " "	+ 50	Tan.	=	1 .18.47
7° 19½′	= " " "	543	B. C.	= sta.	541 + 53.53
9° 49½′	= " " "	+ 50	L. C.	=	2 .33.33
11° 40′	= " " "	543 + 86.86	E. C.	= Sta.	543 + 86.86

100 − 53.53 = 46.47 × 3′ (def. for 1 ft. of 10° Cur.) = 139.41′ = 2° 19½′ = def. for sta. 542.

Def. for 50 ft. = 2° 30′ for a 10° Curve.

Def. for 36.86 ft. = 1° 50½′ for a 10° Curve.

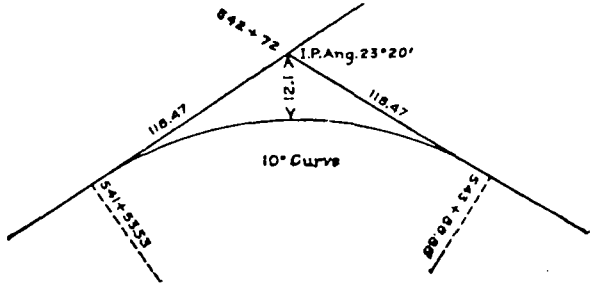


TABLE I.—Tangents and Externals to a 1° Curve. Chord = 100 ft.

Int. Angle	Tangent	External	Int. Angle	Tangent	External	Int. Angle	Tangent	External
1°	50.00	.22	8°	400.66	13.99	15°	754.32	49.44
10'	58.34	.30	10'	409.03	14.58	10'	762.80	50.55
20	66.67	.39	20	417.41	15.18	20	771.29	51.68
30	75.01	.49	30	425.79	15.80	30	779.77	52.82
40	83.34	.61	40	434.17	16.43	40	788.26	53.97
50	91.68	.73	50	442.55	17.07	50	796.75	55.13
2	100.01	.87	9	450.93	17.72	16	805.25	56.31
10	108.35	1.02	10	459.32	18.38	10	813.75	57.50
20	116.68	1.19	20	467.71	19.06	20	822.25	58.70
30	125.02	1.36	30	476.10	19.75	30	830.76	59.91
40	133.36	1.55	40	484.49	20.45	40	839.27	61.14
50	141.70	1.75	50	492.88	21.16	50	847.78	62.38
3	150.04	1.96	10	501.28	21.89	17	856.30	63.63
10	158.38	2.19	10	509.68	22.62	10	864.82	64.90
20	166.72	2.43	20	518.08	23.38	20	873.35	66.18
30	175.06	2.67	30	526.48	24.14	30	881.88	67.47
40	183.40	2.93	40	534.89	24.91	40	890.41	68.77
50	191.74	3.21	50	543.29	25.70	50	898.95	70.09
4	200.08	3.49	11	551.70	26.50	18	907.49	71.42
10	208.43	3.79	10	560.11	27.31	10	916.03	72.76
20	216.77	4.10	20	568.53	28.14	20	924.58	74.12
30	225.12	4.42	30	576.95	28.97	30	933.13	75.49
40	233.47	4.76	40	585.36	29.82	40	941.69	76.86
50	241.81	5.10	50	593.79	30.68	50	950.25	78.26
5	250.16	5.46	12	602.21	31.56	19	958.81	79.67
10	258.51	5.83	10	610.64	32.45	10	967.38	81.09
20	266.86	6.21	20	619.07	33.35	20	975.96	82.53
30	275.21	6.61	30	627.50	34.26	30	984.53	83.97
40	283.57	7.01	40	635.93	35.18	40	993.12	85.43
50	291.92	7.43	50	644.37	36.12	50	1001.7	86.90
6	300.28	7.86	13	652.81	37.07	20	1010.3	88.39
10	308.64	8.31	10	661.25	38.03	10	1018.9	89.89
20	316.99	8.76	20	669.70	39.01	20	1027.5	91.40
30	325.35	9.23	30	678.15	39.99	30	1036.1	92.92
40	333.71	9.71	40	686.60	40.99	40	1044.7	94.46
50	342.08	10.20	50	695.06	42.00	50	1053.3	96.01
7	350.44	10.71	14	703.51	43.03	21	1061.9	97.57
10	358.81	11.22	10	711.97	44.07	10	1070.6	99.16
20	367.17	11.75	20	720.44	45.12	20	1079.2	100.75
30	375.54	12.29	30	728.90	46.18	30	1087.8	102.35
40	383.91	12.85	40	737.37	47.25	40	1096.4	103.97
50	392.28	13.41	50	745.85	48.34	50	1105.1	105.60

Corrections to be Added (T = Tangent. E = External.)

Int. Angle	Curve 5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°
5°	T = .02	.03	.05	.06	.08	.10	.11	.13	.15	.16	.18	.20	.21	.23
	E = .000	.000	.001	.001	.002	.002	.002	.003	.003	.004	.004	.004	.005	.005
10°	T = .03	.06	.09	.13	.16	.19	.22	.25	.28	.31	.34	.38	.42	.46
	E = .001	.003	.004	.006	.007	.008	.009	.011	.012	.014	.015	.017	.018	.020
15°	T = .04	.10	.14	.19	.24	.29	.34	.39	.45	.51	.53	.58	.63	.68
	E = .003	.007	.010	.014	.018	.023	.027	.029	.032	.035	.039	.043	.047	.051
20°	T = .06	.13	.19	.26	.32	.39	.45	.51	.58	.65	.72	.79	.84	.90
	E = .006	.011	.017	.022	.028	.034	.038	.045	.051	.057	.063	.070	.076	.083
25°	T = .08	.16	.24	.33	.40	.49	.58	.67	.75	.83	.90	.99	1.06	1.14
	E = .009	.018	.027	.036	.046	.056	.065	.074	.083	.093	.106	.120	.127	.135

TABLE I.—Tangents and Externals to a 1° Curve. Chord = 100 ft.

Int. Angle	Tangent	External	Int. Angle	Tangent	External	Int. Angle	Tangent	External
22°	1113.7	107.24	29°	1481.8	188.51	36°	1861.7	294.9
10'	1122.4	108.90	10'	1490.7	190.74	10'	1870.9	297.7
20	1131.0	110.57	20	1499.6	192.99	20	1880.1	300.6
30	1139.7	112.25	30	1508.5	195.25	30	1889.4	303.5
40	1148.4	113.95	40	1517.4	197.53	40	1898.6	306.4
50	1157.0	115.66	50	1526.3	199.82	50	1907.9	309.3
23	1165.7	117.38	30	1535.3	202.12	37	1917.1	312.2
10	1174.4	119.12	10	1544.2	204.44	10	1926.4	315.2
20	1183.1	120.87	20	1553.1	206.77	20	1935.7	318.1
30	1191.8	122.63	30	1562.1	209.12	30	1945.0	321.1
40	1200.5	124.41	40	1571.0	211.48	40	1954.3	324.1
50	1209.2	126.20	50	1580.0	213.86	50	1963.6	327.1
24	1217.9	128.00	31	1589.0	216.3	38	1972.9	330.2
10	1226.6	129.82	10	1598.0	218.7	10	1982.2	333.2
20	1235.3	131.65	20	1606.9	221.1	20	1991.5	336.3
30	1244.0	133.50	30	1615.9	223.5	30	2000.9	339.3
40	1252.8	135.35	40	1624.9	226.0	40	2010.2	342.4
50	1261.5	137.23	50	1633.9	228.4	50	2019.6	345.5
25	1270.2	139.11	32	1643.0	230.9	39	2029.0	348.6
10	1279.0	141.01	10	1652.0	233.4	10	2038.4	351.8
20	1287.7	142.93	20	1661.0	235.9	20	2047.8	354.9
30	1296.5	144.85	30	1670.0	238.4	30	2057.2	358.1
40	1305.3	146.79	40	1679.1	241.0	40	2066.6	361.3
50	1314.0	148.75	50	1688.1	243.5	50	2076.0	364.5
26	1322.8	150.71	33	1697.2	246.1	40	2085.4	367.7
10	1331.6	152.69	10	1706.3	248.7	10	2094.9	371.0
20	1340.4	154.69	20	1715.3	251.3	20	2104.3	374.2
30	1349.2	156.70	30	1724.4	253.9	30	2113.8	377.5
40	1358.0	158.72	40	1733.5	256.5	40	2123.3	380.8
50	1366.8	160.76	50	1742.6	259.1	50	2132.7	384.1
27	1375.6	162.81	34	1751.7	261.8	41	2142.2	387.4
10	1384.4	164.86	10	1760.8	264.5	10	2151.7	390.7
20	1393.2	166.95	20	1770.0	267.2	20	2161.2	394.1
30	1402.0	169.04	30	1779.1	269.9	30	2170.8	397.4
40	1410.9	171.15	40	1788.2	272.6	40	2180.3	400.8
50	1419.7	173.27	50	1797.4	275.3	50	2189.9	404.2
28	1428.6	175.41	35	1806.6	278.1	42	2199.4	407.6
10	1437.4	177.55	10	1815.7	280.8	10	2209.0	411.1
20	1446.3	179.72	20	1824.9	283.6	20	2218.6	414.5
30	1455.1	181.89	30	1834.1	286.4	30	2228.1	418.0
40	1464.0	184.08	40	1843.3	289.2	40	2237.7	421.4
50	1472.9	186.29	50	1852.5	292.0	50	2247.3	425.0

Corrections to be Added (T = Tangent. E = External.)

Int. Angle	Curve 5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°
20°	T = .06	.13	.19	.26	.32	.39	.45	.51	.58	.65	.72	.79	.84	.90
	E = .006	.011	.017	.022	.028	.034	.038	.045	.051	.057	.063	.070	.076	.083
25°	T = .08	.16	.24	.33	.40	.49	.58	.67	.75	.83	.90	.99	1.06	1.14
	E = .009	.018	.027	.036	.046	.056	.065	.074	.083	.093	.106	.120	.127	.135
30°	T = .10	.10	.29	.39	.49	.59	.69	.79	.89	.99	1.09	1.20	1.29	1.39
	E = .013	.025	.038	.051	.065	.078	.090	.103	.116	.129	.149	.170	.179	.188
35°	T = .11	.22	.34	.47	.58	.69	.80	.93	1.05	1.17	1.29	1.42	1.54	1.66
	E = .018	.035	.054	.072	.086	.109	.131	.153	.175	.197	.213	.230	.247	.264
40°	T = .13	.26	.40	.53	.67	.80	.93	1.06	1.20	1.34	1.49	1.64	1.79	1.94
	E = .023	.046	.070	.093	.117	.141	.172	.203	.234	.265	.277	.290	.315	.341
45°	T = .15	.30	.44	.60	.76	.91	1.06	1.21	1.37	1.52	1.70	1.87	2.04	2.21
	E = .030	.060	.093	.119	.153	.184	.216	.254	.289	.325	.351	.378	.411	.445

TABLE I.—Tangents and Externals to a 1° Curve. Chord = 100 ft.

Int. Angle	Tangent	External	Int. Angle	Tangent	External	Int. Angle	Tangent	External
43°	2257.0	428.5	50°	2671.8	592.3	57°	3110.9	790.1
10′	2266.6	432.0	10′	2681.9	596.6	10′	3121.7	795.2
20	2276.2	435.6	20	2692.1	600.9	20	3132.6	800.4
30	2285.9	439.2	30	2702.3	605.3	30	3143.4	805.6
40	2295.6	442.8	40	2712.5	609.6	40	3154.2	810.9
50	2305.2	446.4	50	2722.7	614.0	50	3165.1	816.1
44	2314.9	450.0	51	2732.9	618.4	58	3176.0	821.4
10	2324.6	453.6	10	2743.1	622.8	10	3186.9	826.7
20	2334.3	457.3	20	2753.4	627.2	20	3197.8	832.0
30	2344.1	461.0	30	2763.7	631.7	30	3208.8	837.3
40	2353.8	464.6	40	2773.9	636.2	40	3219.7	842.7
50	2363.5	468.4	50	2784.2	640.7	50	3230.7	848.1
45	2373.3	472.1	52	2794.5	645.2	59	3241.7	853.5
10	2383.1	475.8	10	2804.9	649.7	10	3252.7	858.9
20	2392.8	479.6	20	2815.2	654.3	20	3263.7	864.3
30	2402.6	483.4	30	2825.6	658.8	30	3274.8	869.8
40	2412.4	487.2	40	2835.9	663.4	40	3285.8	875.3
50	2422.3	491.0	50	2846.3	668.0	50	3296.9	880.8
46	2432.1	494.8	53	2856.7	672.7	60	3308.0	886.4
10	2441.9	498.7	10	2867.1	677.3	10	3319.1	892.0
20	2451.8	502.5	20	2877.5	682.0	20	3330.3	897.5
30	2461.7	506.4	30	2888.0	686.7	30	3341.4	903.2
40	2471.5	510.3	40	2898.4	691.4	40	3352.6	908.8
50	2481.4	514.3	50	2908.9	696.1	50	3363.8	914.5
47	2491.3	518.2	54	2919.4	700.9	61	3375.0	920.2
10	2501.2	522.2	10	2929.9	705.7	10	3386.3	925.9
20	2511.2	526.1	20	2940.4	710.5	20	3397.5	931.6
30	2521.1	530.1	30	2951.0	715.3	30	3408.8	937.3
40	2531.1	534.2	40	2961.5	720.1	40	3420.1	943.1
50	2541.0	538.2	50	2972.1	725.0	50	3431.4	948.9
48	2551.0	542.2	55	2982.7	729.9	62	3442.7	954.8
10	2561.0	546.3	10	2993.3	734.8	10	3454.1	960.6
20	2571.0	550.4	20	3003.9	739.7	20	3465.4	966.5
30	2581.0	554.5	30	3014.5	744.6	30	3476.8	972.4
40	2591.0	558.6	40	3025.2	749.6	40	3488.3	978.3
50	2601.1	562.8	50	3035.8	754.6	50	3499.7	984.3
49	2611.2	566.9	56	3046.5	759.6	63	3511.1	990.2
10	2621.2	571.1	10	3057.2	764.6	10	3522.6	996.2
20	2631.3	575.3	20	3067.9	769.7	20	3534.1	1002.3
30	2641.4	579.5	30	3078.7	774.7	30	3545.6	1008.3
40	2651.5	583.8	40	3089.4	779.8	40	3557.2	1014.4
50	2661.6	588.0	50	3100.2	784.9	50	3568.7	1020.5

Corrections to be Added (T = Tangent. E = External.)

Int. Angle	Curve 5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°
40°	T = .13	.26	.40	.53	.67	.80	.93	.106	1.20	1.34	1.49	1.64	1.79	1.94
	E = .023	.046	.070	.093	.117	.141	.172	.203	.234	.265	.277	.290	.315	.341
45°	T = .15	.30	.44	.60	.76	.91	1.06	1.21	1.37	1.52	1.70	1.87	2.04	2.21
	E = .030	.060	.093	.119	.153	.184	.216	.254	.289	.325	.351	.378	.411	.445
50°	T = .17	.34	.51	.68	.85	1.02	1.19	1.36	1.54	1.72	1.91	2.10	2.29	2.48
	E = .037	.075	.116	.151	.189	.227	.266	.305	.345	.384	.425	.467	.508	.550
55°	T = .19	.38	.57	.76	.95	1.14	1.32	1.52	1.72	1.92	2.14	2.35	2.56	2.77
	E = .046	.093	.142	.188	.236	.283	.332	.381	.420	.479	.530	.582	.641	.700
60°	T = .21	.42	.63	.84	1.05	1.27	1.49	1.71	1.94	2.17	2.38	2.60	2.83	3.07
	E = .056	.112	.168	.225	.283	.340	.398	.457	.516	.575	.636	.697	.774	.851
65°	T = .23	.46	.69	.93	1.16	1.40	1.64	1.88	2.13	2.38	2.63	2.88	3.13	3.39
	E = .067	.135	.204	.273	.343	.412	.483	.554	.625	.697	.711	.845	.922	1.01

TABLE I.—Tangents and Externals to a 1° Curve. Chord = 100 ft.

Int. Angle	Tangent	External	Int. Angle	Tangent	External	Int. Angle	Tangent	External
64°	3580.3	1026.6	71°	4086.9	1308.2	78°	4639.8	1643.0
10′	3591.9	1032.8	10′	4099.5	1315.6	10′	4653.6	1651.7
20	3603.5	1039.0	20	4112.1	1322.9	20	4667.4	1660.5
30	3615.1	1045.2	30	4124.8	1330.3	30	4681.3	1669.2
40	3626.8	1051.4	40	4137.4	1337.7	40	4695.2	1678.1
50	3638.5	1057.7	50	4150.1	1345.1	50	4709.2	1686.9
65	3650.2	1063.9	72	4162.8	1352.6	79	4723.2	1695.8
10	3661.9	1070.2	10	4175.6	1360.1	10	4737.2	1704.7
20	3673.7	1076.6	20	4188.5	1367.6	20	4751.2	1713.7
30	3685.4	1082.9	30	4201.2	1375.2	30	4765.3	1722.7
40	3697.2	1089.3	40	4214.0	1382.8	40	4779.4	1731.7
50	3709.0	1095.7	50	4226.8	1390.4	50	4793.6	1740.8
66	3720.9	1102.2	73	4239.7	1398.0	80	4807.7	1749.9
10	3732.7	1108.6	10	4252.6	1405.7	10	4822.0	1759.0
20	3744.6	1115.1	20	4265.6	1413.5	20	4836.2	1768.2
30	3756.5	1121.7	30	4278.5	1421.2	30	4850.5	1777.4
40	3768.5	1128.2	40	4291.5	1429.0	40	4864.8	1786.7
50	3780.4	1134.8	50	4304.6	1436.8	50	4879.2	1796.0
67	3792.4	1141.4	74	4317.6	1444.6	81	4893.6	1805.3
10	3804.4	1148.0	10	4330.7	1452.5	10	4908.0	1814.7
20	3816.4	1154.7	20	4343.8	1460.4	20	4922.5	1824.1
30	3828.4	1161.3	30	4356.9	1468.4	30	4937.0	1833.6
40	3840.5	1168.1	40	4370.1	1476.4	40	4951.5	1843.1
50	3852.6	1174.8	50	4383.3	1484.4	50	4966.1	1852.6
68	3864.7	1181.6	75	4396.5	1492.4	82	4980.7	1862.2
10	3876.8	1188.4	10	4409.8	1500.5	10	4995.4	1871.8
20	3889.0	1195.2	20	4423.1	1508.6	20	5010.0	1881.5
30	3901.2	1202.0	30	4436.4	1516.7	30	5024.8	1891.2
40	3913.4	1208.9	40	4449.7	1524.9	40	5039.5	1900.9
50	3925.6	1215.8	50	4463.1	1533.1	50	5054.3	1910.7
69	3937.9	1222.7	76	4476.5	1541.4	83	5069.2	1920.5
10	3950.2	1229.7	10	4489.9	1549.7	10	5084.0	1930.4
20	3962.5	1236.7	20	4503.4	1558.0	20	5099.0	1940.3
30	3974.8	1243.7	30	4516.9	1566.3	30	5113.9	1950.3
40	3987.2	1250.8	40	4530.4	1574.7	40	5128.9	1960.2
50	3999.5	1257.9	50	4544.0	1583.1	50	5143.9	1970.3
70	4011.9	1265.0	77	4557.6	1591.6	84	5159.0	1980.4
10	4024.4	1272.1	10	4571.2	1600.1	10	5174.1	1990.5
20	4036.8	1279.3	20	4584.8	1608.6	20	5189.3	2000.6
30	4049.3	1286.5	30	4598.5	1617.1	30	5204.4	2010.8
40	4061.8	1293.6	40	4612.2	1625.7	40	5219.7	2021.1
50	4074.4	1300.9	50	4626.0	1634.4	50	5234.9	2031.4

Corrections to be Added (T = Tangent. E = External.)

Int. Angle	Curve 5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°
60°	T = .21	.42	.63	.84	1.05	1.27	1.49	1.71	1.94	2.17	2.38	2.60	2.83	3.07
	E = .056	.112	.168	.225	.283	.340	.398	.457	.516	.575	.636	.697	.774	.851
65°	T = .23	.46	.69	.93	1.16	1.40	1.64	1.88	2.13	2.38	2.63	2.88	3.13	3.39
	E = .067	.135	.204	.273	.343	.412	.483	.554	.625	.697	.711	.845	.922	1.01
70°	T = .25	.51	.76	1.02	1.28	1.54	1.80	2.06	2.33	2.60	2.88	3.16	3.44	3.72
	E = .080	.159	.240	.321	.403	.485	.568	.652	.735	.819	.906	.994	1.08	1.17
75°	T = .27	.56	.83	1.12	1.40	1.69	1.98	2.27	2.57	2.87	3.16	3.47	3.78	4.09
	E = .095	.182	.286	.383	.480	.578	.678	.777	.877	.977	1.07	1.18	1.29	1.39
80°	T = .30	.61	.91	1.22	1.53	1.84	2.15	2.46	2.78	3.10	3.44	3.78	4.12	4.46
	E = .110	.220	.332	.445	.558	.671	.787	.903	1.02	1.13	1.25	1.38	1.50	1.62
85°	T = .33	.66	1.00	1.33	1.68	2.02	2.36	2.70	3.05	3.40	3.77	4.14	4.55	4.89
	E = .128	.259	.391	.524	.657	.790	.926	1.06	1.20	1.34	1.47	1.62	1.76	1.91

Table I.—Tangents and Externals to a 1° Curve. Chord = 100 ft.

Int. Angle	Tangent	External	Int. Angle	Tangent	External	Int. Angle	Tangent	External
85°	5250.3	2041.7	92°	5933.2	2518.5	99°	6708.6	3092.7
10′	5265.6	2052.1	10′	5950.5	2531.0	10′	6728.4	3107.7
20	5281.0	2062.5	20	5967.9	2543.5	20	6748.2	3122.9
30	5296.4	2073.0	30	5985.3	2556.0	30	6768.1	3138.1
40	5311.9	2083.5	40	6002.7	2568.6	40	6788.1	3153.3
50	5327.4	2094.1	50	6020.2	2581.3	50	6808.2	3168.7
86	5343.0	2104.7	93	6037.8	2594.0	100	6828.3	3184.1
10	5358.6	2115.3	10	6055.4	2606.8	10	6848.5	3199.6
20	5374.2	2126.0	20	6073.1	2619.7	20	6868.8	3215.1
30	5389.9	2136.7	30	6090.8	2632.6	30	6889.2	3230.8
40	5405.6	2147.5	40	6108.6	2645.5	40	6909.6	3246.5
50	5421.4	2158.4	50	6126.4	2658.5	50	6930.1	3262.3
87	5437.2	2169.2	94	6144.3	2671.6	101	6950.6	3278.1
10	5453.1	2180.2	10	6162.6	2684.7	10	6971.3	3294.1
20	5469.0	2191.1	20	6180.2	2697.9	20	6992.0	3310.1
30	5484.9	2202.2	30	6198.3	2711.2	30	7012.7	3326.1
40	5500.9	2213.2	40	6216.4	2724.5	40	7033.6	3342.3
50	5517.0	2224.3	50	6234.6	2737.9	50	7054.5	3358.5
88	5533.1	2235.5	95	6252.8	2751.3	102	7075.5	3374.9
10	5549.2	2246.7	10	6271.1	2764.8	10	7096.6	3391.2
20	5565.4	2258.0	20	6289.4	2778.3	20	7117.8	3407.7
30	5581.6	2269.3	30	6307.9	2792.0	30	7139.0	3424.3
40	5597.8	2280.6	40	6326.3	2805.6	40	7160.3	3440.9
50	5614.2	2292.0	50	6344.8	2819.4	50	7181.7	3457.6
89	5630.5	2303.5	96	6363.4	2833.2	103	7203.2	3474.4
10	5646.9	2315.0	10	6382.1	2847.0	10	7224.7	3491.3
20	5663.4	2326.6	20	6400.8	2861.0	20	7246.3	3503.2
30	5679.9	2338.2	30	6419.5	2875.0	30	7268.0	3525.2
40	5696.4	2349.8	40	6438.4	2889.0	40	7289.8	3542.4
50	5713.0	2361.5	50	6457.3	2903.1	50	7311.7	3559.6
90	5729.7	2373.3	97	6476.2	2917.3	104	7333.6	3576.8
10	5746.3	2385.1	10	6495.2	2931.6	10	7355.6	3594.2
20	5763.1	2397.0	20	6514.3	2945.9	20	7377.8	3611.7
30	5779.9	2408.9	30	6533.4	2960.3	30	7399.9	3629.2
40	5796.7	2420.9	40	6552.6	2974.7	40	7422.2	3646.8
50	5813.6	2432.9	50	6571.9	2989.2	50	7444.6	3664.5
91	5830.5	2444.9	98	6591.2	3003.8	105	7467.0	3682.3
10	5847.5	2457.1	10	6610.6	3018.4	10	7489.6	3700.2
20	5864.6	2469.3	20	6630.1	3033.1	20	7512.2	3718.2
30	5881.7	2481.5	30	6649.6	3047.9	30	7534.9	3736.2
40	5898.8	2493.8	40	6669.2	3062.8	40	7557.7	3754.4
50	5916.0	2506.1	50	6688.8	3077.7	50	7580.5	3772.6

Corrections to be Added (T = Tangent. E = External.)

Int. Angle	Curve 5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°
85°	T = .33	.66	1.00	1.33	1.68	2.02	2.36	2.70	3.05	3.40	3.77	4.14	4.55	4.89
	E = .128	.259	.391	.524	.657	.790	.926	1.06	1.20	1.34	1.47	1.62	1.76	1.91
90°	T = .36	.72	1.09	1.45	1.83	2.20	2.57	2.94	3.32	3.70	4.10	4.50	4.91	5.32
	E = .149	.299	.450	.603	.756	.910	1.07	1.22	1.38	1.54	1.70	1.87	2.03	2.20
95°	T = .39	.79	1.19	1.55	2.00	2.40	2.80	3.20	3.61	4.02	4.49	4.98	5.38	5.83
	E = .174	.350	.522	.706	.985	1.06	1.25	1.43	1.62	1.80	1.99	2.18	2.38	2.58
100°	T = .43	.86	1.30	1.74	2.18	2.62	3.06	3.50	3.95	4.40	4.88	5.37	5.85	6.34
	E = .200	.401	.604	.809	1.01	1.22	1.43	1.64	1.85	2.06	2.28	2.50	2.73	2.96
105°	T = .46	.94	1.42	1.90	2.38	2.87	3.34	3.84	4.35	4.84	5.35	5.87	6.40	6.93
	E = .230	.470	.700	.938	1.17	1.42	1.65	1.90	2.14	2.39	2.64	2.90	3.16	3.41

Table I.—Tangents and Externals to a 1° Curve. Chord = 100 ft.

Int. Angle	Tangent	External	Int. Angle	Tangent	External	Int. Angle	Tangent	External
106°	7603.5	3791.0	111°	8336.7	4386.1	116°	9169.4	5082.7
10′	7626.6	3809.4	10′	8362.7	4407.6	10′	9199.1	5107.9
20	7649.7	3827.9	20	8388.9	4429.2	20	9229.0	5133.3
30	7672.9	3846.5	30	8415.1	4450.9	30	9259.0	5158.8
40	7696.3	3865.2	40	8441.5	4472.7	40	9289.2	5184.5
50	7719.7	3884.0	50	8468.0	4494.6	50	9319.5	5210.3
107	7743.2	3902.9	112	8494.6	4516.6	117	9349.9	5236.2
10	7766.8	3921.9	10	8521.3	4538.8	10	9380.5	5262.3
20	7790.5	3940.9	20	8548.1	4561.1	20	9411.3	5288.6
30	7814.3	3960.1	30	8575.0	4583.4	30	9442.2	5315.0
40	7838.1	3979.4	40	8602.1	4606.0	40	9473.2	5341.5
50	7862.1	3998.7	50	8629.3	4628.6	50	9504.4	5368.2
108	7886.2	4018.2	113	8656.6	4651.3	118	9535.7	5395.1
10	7910.4	4037.8	10	8684.0	4674.2	10	9567.2	5422.1
20	7934.6	4057.4	20	8711.5	4697.2	20	9598.9	5449.2
30	7959.0	4077.2	30	8739.2	4720.3	30	9630.7	5476.5
40	7983.5	4097.1	40	8767.0	4743.6	40	9662.6	5504.0
50	8008.0	4117.0	50	8794.9	4766.9	50	9694.7	5531.7
109	8032.7	4137.1	114	8822.9	4790.4	119	9727.0	5559.4
10	8057.4	4157.3	10	8851.0	4814.1	10	9759.4	5587.4
20	8082.3	4177.5	20	8879.3	4837.8	20	9792.0	5615.5
30	8107.3	4197.9	30	8907.7	4861.7	30	9824.8	5643.8
40	8132.3	4218.4	40	8936.3	4885.7	40	9857.7	5672.3
50	8157.5	4239.0	50	8965.0	4909.9	50	9890.8	5700.9
110	8182.8	4259.7	115	8993.8	4934.1	120	9924.0	5729.7
10	8208.2	4280.5	10	9022.7	4958.6	10	9957.5	5758.6
20	8233.7	4301.4	20	9051.7	4983.1	20	9991.0	5787.7
30	8259.3	4322.4	30	9080.9	5007.8	30	10025.0	5817.0
40	8285.0	4343.6	40	9110.3	5032.6	40	10059.0	5846.5
50	8310.8	4364.8	50	9139.8	5057.6	50	10093.0	5876.1

Corrections to be Added (T = Tangent. E = External.)

Int. Angle	Curve 5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°
100°	T = .43	.86	1.30	1.74	2.18	2.62	3.06	3.50	3.95	4.40	4.88	5.37	5.85	6.34
	E = .200	.401	.604	.809	1.01	1.22	1.43	1.64	1.85	2.06	2.28	2.50	2.73	2.96
105°	T = .46	.94	1.42	1.90	2.38	2.87	3.34	3.84	4.35	4.84	5.35	5.87	6.40	6.93
	E = .230	.470	.700	.938	1.17	1.42	1.65	1.90	2.14	2.39	2.64	2.90	3.16	3.41
110°	T = .50	1.03	1.55	2.08	2.60	3.14	3.66	4.21	4.76	5.31	5.86	6.43	7.01	7.59
	E = .260	.535	.808	1.08	1.36	1.63	1.91	2.19	2.49	2.61	3.05	3.35	3.65	3.95
115°	T = .54	1.13	1.70	2.29	2.86	3.45	4.03	4.63	5.23	5.83	6.44	7.07	7.70	8.35
	E = .307	.624	.939	1.26	1.57	1.89	2.21	2.54	2.87	3.20	3.53	3.88	4.23	4.58
120°	T = .61	1.25	1.89	2.52	3.16	3.81	4.44	5.11	5.78	6.44	7.11	7.80	8.51	9.21
	E = .339	.720	1.08	1.45	1.82	2.20	2.56	2.95	3.33	3.72	4.10	4.50	4.91	5.32

TABLE II.—Radii, Ordinates and Deflections. Chord = 100 ft.

Deg.	Radius	Mid. Ord.	Tan. Dist.	Def. Dist.	Def. for 1 Ft.	Deg.	Radius	Mid. Ord.	Tan. Dist.	Def. Dist.	Def. for 1 Ft.
	ft.	ft.	ft.	ft.			ft.	ft.	ft.	ft.	
0°10'	34377.	.036	.145	.291	0.05	7°	819.0	1 528	6.105	12.21	2.10
20	17189.	.073	.291	.582	0.10	20'	781.8	1.600	6.395	12.79	2.20
30	11459.	.109	.436	.873	0.15	30	764.5	1.637	6.540	13 08	2.25
40	8594.4	.145	.582	1.164	0.20	40	747.9	1.673	6.685	13.37	2.30
50	6875.5	.182	.727	1.454	0.25	8	716.8	1.746	6.976	13.95	2.40
1	5729.6	.218	.873	1.745	0.30	20	688.2	1.819	7.266	14.53	2.50
10	4911.2	.255	1.018	2 036	0.35	30	674.7	1.855	7.411	14.82	2.55
20	4297.3	.291	1.164	2.327	0.40	40	661.7	1.892	7.556	15.11	2.60
30	3819 8	.327	1.309	2.618	0.45	9	637.3	1.965	7.846	15.69	2.70
40	3437.9	.364	1.454	2.909	0.50	20	614 6	2 037	8.136	16.27	2.80
50	3125.4	.400	1.600	3.200	0.55	30	603.8	2.074	8.281	16.56	2.85
2	2864 9	.436	1.745	3.490	0.60	40	593 4	2.110	8.426	16 85	2.90
10	2644.6	.473	1.891	3.781	0.65	10	573.7	2.183	8.716	17.43	3.00
20	2455.7	.509	2.036	4.072	0.70	30	546.4	2.292	9.150	18.30	3.15
30	2292.0	.545	2.181	4.363	0.75	11	521.7	2.402	9.585	19.16	3.30
40	2148.8	.582	2.327	4.654	0.80	30	499.1	2.511	10.02	20.04	3.45
50	2022.4	.618	2.472	4.945	0.85	12	478.3	2.620	10.45	20.91	3.60
3	1910.1	.655	2.618	5.235	0.90	30	459.3	2.730	10.89	21.77	3.75
10	1809.6	.691	2.763	5.526	0.95	13	441.7	2.839	11.32	22.64	3.90
20	1719.1	.727	2.908	5.817	1.00	30	425.4	2.949	11.75	23.51	4.05
30	1637.3	.764	3.054	6.108	1.05	14	410.3	3.058	12.18	24.37	4.20
40	1562.9	.800	3.199	6.398	1.10	30	396.2	3.168	12.62	25.24	4.35
50	1495.0	.836	3.345	6.689	1.15	15	383.1	3.277	13.05	26.11	4.50
4	1432.7	.873	3 490	6.980	1.20	30	370.8	3.387	13.49	26.97	4.65
10	1375.4	.909	3.635	7.271	1.25	16	359.3	3.496	13.92	27.84	4.80
20	1322.5	.945	3.718	7.561	1.30	30	348.5	3.606	14.35	28.70	4.95
30	1273.6	.982	3.926	7.852	1.35	17	338.3	3.716	14.78	29.56	5.10
40	1228.1	1.018	4.071	8.143	1.40	18	319.6	3.935	15.64	31.29	5.40
50	1185.8	1.055	4.217	8.433	1.45	19	302.9	4.155	16.51	33 01	5.70
5	1146.3	1.091	4.362	8.724	1.50	20	287.9	4.374	17.37	34.73	6.00
10	1109.3	1.127	4.507	9.014	1.55	21	274.4	4.594	18.22	36.44	6.30
20	1074.7	1.164	4.653	9.305	1.60	22	262.0	4.814	19.08	38.16	6.60
30	1042.1	1.200	4.798	9.596	1.65	23	250.8	5.035	19.94	39.87	6.90
40	1011.5	1.237	4.943	9.886	1.70	24	240.5	5.255	20.79	41.58	7.20
50	982.6	1.273	5.088	10.18	1.75	25	231.0	5.476	21.64	43.28	7.50
6	955.4	1.309	5.234	10.47	1.80	26	222.3	5.697	22.50	44.99	7.80
10	929.6	1.346	5.379	10.76	1.85	27	214.2	5.918	23.35	46.69	8.10
20	905.1	1.382	5.524	11.05	1.90	28	206.7	6.139	24.19	48.38	8.40
30	881.9	1.418	5.669	11.34	1.95	29	199.7	6.360	25.04	50.07	8.70
40	859.9	1.455	5.814	11.63	2.00	30	193.2	6.583	25.88	51.76	9.00

The middle ordinate in inches for any cord of length (C) is equal to .0012 C^2 multiplied by the middle ordinate taken from the above table. Thus, if it desired to bend a 30 ft. rail to fit a 10 degree curve, its middle ordinate should be .0012 × 900 × 2.183 or 2.36 inches.

TABLE III.—Deflections for Sub Chords for Short Radius Curves.

Degree of Curve	Radius 50 / sin. ½ def. ang.	½ sub chord / R = sin of ½ def. angle				Length of arc for 100 ft.
		12.5 Ft.	15 Ft.	20 Ft.	25 Ft.	
30°	193.18	1° 51'	2° 17'	2° 58'	3° 43'	101.15
32°	181.39	1° 59'	2° 25'	3° 10'	3° 58'	101.33
34°	171.01	2° 06'	2° 33'	3° 21'	4° 12'	101.48
36°	161.80	2° 13'	2° 41'	3° 33'	4° 26'	101.66
38°	153.58	2° 20'	2° 49'	3° 44'	4° 40'	101.85
40°	146.19	2° 27'	2° 57'	3° 55'	4° 54'	102.06
42°	139.52	2° 34'	3° 05'	4° 07'	5° 08'	102.29
44°	133.47	2° 41'	3° 13'	4° 18'	5° 22'	102.53
46°	127.97	2° 48'	3° 21'	4° 29'	5° 36'	102.76
48°	122.92	2° 55'	3° 29'	4° 40'	5° 50'	103.00
50°	118.31	3° 02'	3° 38'	4° 51'	6° 04'	103.24
52°	114.06	3° 09'	3° 46'	5° 02'	6° 17'	103.54
54°	110.11	3° 16'	3° 54'	5° 13'	6° 31'	103.84
56°	106.50	3° 22'	4° 02'	5° 23'	6° 44'	104.14
58°	103.14	3° 29'	4° 10'	5° 34'	6° 57'	104.43
60°	100 00	3° 35'	4° 18'	5° 44'	7° 11'	104.72

$T = R \tan \frac{1}{2} I$

$T = \frac{50 \tan \frac{1}{2} I}{\text{Sin. } \frac{1}{2} D}$

$\text{Sin. } \frac{1}{2} D = \frac{50}{R}$

$\text{Sin. } \frac{1}{2} D = \frac{50 \tan \frac{1}{2} I}{T}$

$R = T \cot \frac{1}{2} I$

$R = \frac{50}{\text{Sin. } \frac{1}{2} D}$

$E = R \text{ ex. sec } \frac{1}{2} I$

$E = T \tan \frac{1}{4} I$

$\text{Chord def.} = \frac{\text{chord}^2}{R}$

$\text{No. chords} = \frac{I}{D}$

Tan. def. = ½ chord def.

The square of any distance, divided by twice the radius, will equal the distance from tangent to curve, very nearly.

To find angle for a given distance and deflection.

Rule 1. Multiply the given distance by .01745 (def. for 1° for 1 ft. see Table II.), and divide given deflection by the product.

Rule 2. Multiply given deflection by 57.3, and divide the product by the given distance.

To find deflection for a given angle and distance. Multiply the angle by .01745, and the product by the distance.

GENERAL DATA

RIGHT ANGLE TRIANGLES. Square the altitude, divide by twice the base. Add quotient to base for hypotenuse.

Given Base 100, Alt. $10.10^2 \div 200 = .5$. $100 + .5 = 100.5$ hyp.

Given Hyp. 100, Alt. $25.25^2 \div 200 = 3.125$. $100 - 3.125 = 96.875 =$ Base.

Error in first sample, .002; in last, .045.

To find Tons of Rail in one mile of track: multiply weight per yard by 11, and divide by 7.

LEVELING. The correction for curvature and refraction, in feet and decimals of feet is equal to $0.574d^2$, where d is the distance in miles. The correction for curvature alone is closely, $\frac{2}{3}d^2$. The combined correction is negative.

PROBABLE ERROR. If d_1, d_2, d_3, etc. are the discrepancies of various results from the mean, and if $\Sigma d^2 =$ the sum of the squares of these differences and n = the number of observations, then the probable error of the mean =

$$\pm 0.6745 \sqrt{\frac{\Sigma d^2}{n(n-1)}}$$

TABLE IV.—Minutes in Decimals of a Degree.

1'	.0167	11'	.1833	21'	.3500	31'	.5167	41'	.6833	51'	8500
2	.0333	12	.2000	22	.3667	32	.5333	42	.7000	52	.8667
3	.0500	13	.2167	23	.3833	33	.5500	43	.7167	53	.8833
4	.0667	14	.2333	24	.4000	34	.5667	44	.7333	54	.9000
5	.0833	15	.2500	25	.4167	35	.5833	45	.7500	55	.9167
6	.1000	16	.2667	26	.4333	36	.6000	46	.7667	56	.9333
7	.1167	17	.2833	27	.4500	37	.6167	47	.7833	57	.9500
8	.1333	18	.3000	28	.4667	38	.6333	48	.8000	58	.9667
9	.1500	19	.3167	29	.4833	39	.6500	49	.8167	59	.9833
10	.1667	20	.333	30	.5000	40	.6667	50	.8333	60	1.0000

TABLE V.—Inches in Decimals of a Foot.

1–16	3–32	⅛	3–16	¼	5–16	⅜	½	⅝	¾	⅞
.0052	.0078	0104	0156	.0208	.0260	.0313	.0417	.0521	.0625	.0729
1	2	3	4	5	6	7	8	9	10	11
.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333	.9167

Angle	Sin.	Tan.	Sec.	Cosec.	Cotg.	Cosin.	
° ′							
0	0	0	1.	∞	∞	1.	90
10	0029	0029		343.8	343.8	1.	50
20	0058	0058		171.9	171.9	.99998	40
30	0087	0087		114.6	114.6	.99996	30
40	0116	0116	1.0001	85 94	85.94	.99993	20
50	0145	0145	1.0001	68.76	68.75	.99989	10
1	0175	0175	1.0002	57.30	57.29	.99985	89
10	0204	0204	1.0002	49.11	49.10	.99979	50
20	0233	0233	1.0003	42.98	42.96	.99973	40
30	0262	0262	1 0003	38.20	38.19	.99966	30
40	0291	0291	1.0004	34.38	34.37	.99958	20
50	0320	0320	1.0005	31.26	31.24	.99949	10
2	0349	0349	1.0006	28.65	28.64	.99939	88
10	0378	0378	1.0007	26.45	26.43	.99929	50
20	0407	0407	1.0008	24.56	24.54	.99917	40
30	0436	0437	1.0010	22.93	22.90	.99905	30
40	0465	0466	1.0011	21.49	21.47	.99892	20
50	0494	0495	1.0012	20.23	20.21	.99878	10
3	0523	0524	1.0014	19.11	19.08	.99863	87
10	0552	0553	1.0015	18.10	18.07	.99847	50
20	0581	0582	1.0017	17.20	17.17	.99831	40
30	0610	0612	1.0019	16.38	16 35	99813	30
40	0640	0641	1.0020	15.64	15.60	99795	20
50	0669	0670	1.0022	14 96	14.92	.99776	10
4	0698	0699	1.0024	14.34	14.30	.99756	86
10	0727	0729	1 0027	13.76	13.73	.99736	50
20	0756	0758	1.0029	13.23	13.20	.99714	40
30	0785	0787	1.0031	12.75	12.71	.99692	30
40	0814	0816	1.0033	12.29	12.25	.99668	20
50	0843	0846	1.0036	11.87	11.83	.99644	10
5	0872	0875	1.0038	11.47	11.43	.99619	85
10	0901	0904	1.0041	11.10	11.06	.99594	50
20	0929	0934	1 0043	10.76	10.71	.99567	40
30	0958	0963	1.0046	10.43	10.39	.99540	30
40	0987	0992	1.0049	10.13	10.08	.99511	20
50	1016	1022	1.0052	9.839	9.788	.99482	10
6	1045	1051	1.0055	9.567	9.514	.99452	84
10	1074	1080	1.0058	9.309	9.255	.99421	50
20	1103	1110	1.0061	9.065	9.010	.99390	40
30	1132	1139	1.0065	8.834	8.777	.99357	30
40	1161	1169	1.0068	8.614	8.556	.99324	20
50	1190	1198	1 0072	8.405	8.345	.99290	10
7	1219	1228	1.0075	8 206	8.144	.99255	83
10	1248	1257	1.0079	8.016	7.953	.99219	50
20	1276	1287	1.0082	7.834	7.770	.99182	40
30	1305	1317	1.0086	7.661	7.596	.99144	30
40	1334	1346	1.0090	7.496	7.429	.99106	20
50	1363	1376	1.0094	7.337	7.269	.99067	10
							82
							° ′
	Cosin.	Cotg.	Cosec.	Sec.	Tan.	Sin.	Angle

Angle	Sin.	Tan.	Sec.	Cose.	Cotg.	Cosin.	
° ′							
8	.1392	.1405	1.0098	7.185	7.115	.99027	82
10	.1421	.1435	1.0102	7.040	6.968	.98986	50
20	.1449	.1465	1.0107	6.900	6.827	.98944	40
30	.1478	.1495	1.0111	6 766	6.691	.98902	30
40	.1507	.1524	1.0115	6 636	6.561	.98858	20
50	.1536	.1554	1.0120	6.512	6 435	.98814	10
9	.1564	.1584	1.0125	6.394	6.314	.98769	81
10	.1593	.1614	1.0129	6 277	6.197	.98723	50
20	.1622	.1644	1.0134	6.166	6 084	.98676	40
30	.1650	.1673	1.0139	6.059	5.976	.98629	30
40	.1679	.1703	1.0144	5.955	5.871	.98580	20
50	.1708	.1733	1.0149	5.855	5.769	.98531	10
10	.1736	.1763	1.0154	5.759	5.671	.98481	80
10	.1765	.1793	1.0160	5.665	5.576	.98430	50
20	.1794	.1823	1.0165	5.575	5.485	.98378	40
30	.1822	.1853	1.0170	5.488	5.396	.98325	30
40	.1851	.1883	1.0176	5.403	5.309	.98272	20
50	.1880	.1914	1.0181	5.320	5 226	.98218	10
11	.1908	.1944	1.0187	5.241	5.145	.98163	79
10	.1937	.1974	1.0193	5.164	5.066	.98107	50
20	.1965	.2004	1.0199	5.089	4.989	.98050	40
30	.1994	.2035	1.0205	5.016	4.915	.97992	30
40	.2022	.2065	1.0211	4.945	4.843	.97934	20
50	.2051	.2095	1.0217	4.877	4.773	.97875	10
12	.2079	.2126	1.0223	4 810	4.705	.97815	78
10	.2108	.2156	1.0230	4.745	4 638	.97754	50
20	.2136	.2186	1.0236	4.682	4.574	.97692	40
30	.2164	.2217	1.0243	4.620	4.511	.97630	30
40	.2193	.2247	1.0249	4.560	4.449	.97566	20
50	.2221	.2278	1.0256	4.502	4.390	.97502	10
13	.2250	.2309	1.0263	4.445	4.331	.97437	77
10	.2278	.2339	1.0270	4.390	4 275	.97371	50
20	.2306	.2370	1.0277	4.336	4 219	.97304	40
30	.2334	.2401	1.0284	4.284	4.165	.97237	30
40	.2363	.2432	1.0291	4.232	4.113	.97169	20
50	.2391	.2462	1.0299	4.182	4.061	.97100	10
14	.2419	.2493	1.0306	4.133	4.011	.97030	76
10	.2447	.2524	1.0314	4.086	3.962	.96959	50
20	.2476	.2555	1.0321	4.039	3.914	.96887	40
30	.2504	.2586	1.0329	3.994	3.867	.96815	30
40	.2532	.2617	1.0337	3.949	3.821	.96742	20
50	.2560	.2648	1.0345	3.906	3.776	.96667	10
15	.2588	.2679	1.0353	3.864	3.732	.96593	75
10	.2616	.2711	1.0361	3.822	3.689	.96517	50
20	.2644	.2742	1.0369	3.782	3.647	.96440	40
30	.2672	.2773	1.0377	3.742	3.606	.96363	30
40	.2700	.2805	1.0386	3.703	3.566	.96285	20
50	.2728	.2836	1.0394	3.665	3.526	.96206	10
							74
							° ′
	Cosin.	Cotg.	Cosec.	Sec.	Tan.	Sin.	Angle

Angle	Sin.	Tan.	Sec.	Cosec.	Cotg.	Cosin.	
° ′							
16	.2756	.2867	1.0403	3.628	3.487	.96126	74
10	.2784	.2899	1.0412	3.592	3.450	.96046	50
20	.2812	.2931	1.0423	3.556	3.412	.95964	40
30	.2840	.2962	1.0429	3.521	3.376	.95882	30
40	.2868	.2994	1.0438	3.487	3.340	.95799	20
50	.2896	.3026	1.0448	3.453	3.305	.95715	10
17	.2924	.3057	1.0457	3.420	3.271	.95630	73
10	.2952	.3089	1.0466	3.388	3.237	.95545	50
20	.2979	.3121	1.0476	3.357	3.204	.95459	40
30	.3007	.3153	1.0485	3.326	3.172	.95372	30
40	.3035	.3185	1.0495	3.295	3.140	.95284	20
50	.3062	.3217	1.0505	3.265	3.108	.95195	10
18	.3090	.3249	1.0515	3.236	3.078	.95106	72
10	.3118	.3281	1.0525	3.207	3.048	.95015	50
20	.3145	.3314	1.0535	3.179	3.018	.94924	40
30	.3173	.3346	1.0545	3.152	2.989	.94832	30
40	.3201	.3378	1.0555	3.124	2.960	.94740	20
50	.3228	.3411	1.0566	3.098	2.932	.94646	10
19	.3256	.3443	1.0576	3.072	2.904	.94552	71
10	.3283	.3476	1.0587	3.046	2.877	.94457	50
20	.3311	.3508	1.0598	3.020	2.850	.94361	40
30	.3338	.3541	1.0608	2.996	2.824	.94264	30
40	.3365	.3574	1.0619	2.971	2 798	.94167	20
50	.3393	.3607	1.0631	2.947	2.773	.94068	10
20	.3420	.3640	1.0642	2.924	2.747	.93969	70
10	.3448	.3673	1.0653	2.900	2.723	.93869	50
20	.3475	.3706	1 0665	2 878	2.699	.93769	40
30	.3502	.3739	1.0676	2.856	2.675	.93667	30
40	.3529	.3772	1.0688	2.833	2.651	.93565	20
50	.3557	.3805	1.0700	2.811	2 628	.93462	10
21	.3584	.3839	1.0711	2.790	2.605	.93358	69
10	.3611	.3872	1 0723	2.769	2.583	.93253	50
20	.3638	.3906	1.0736	2.749	2.560	.93148	40
30	.3665	.3939	1.0748	2.729	2 539	.93042	30
40	.3692	.3973	1.0760	2.709	2.517	.92935	20
50	.3719	.4006	1.0773	2.689	2.496	.92827	10
22	.3746	.4040	1.0785	2.670	2.475	.92718	68
10	.3773	.4074	1.0798	2.650	2.455	.92609	50
20	.3800	.4108	1.0811	2.632	2.434	.92499	40
30	.3827	.4142	1.0824	2.613	2.414	.92388	30
40	.3854	.4176	1.0837	2.595	2.394	.92276	20
50	.3881	.4210	1.0850	2.577	2.375	.92164	10
23	.3907	.4245	1.0864	2.559	2.356	.92050	67
10	.3934	.4279	1.0877	2.542	2.337	.91936	50
20	.3961	.4314	1.0891	2.525	2 318	.91822	40
30	.3987	.4348	1.0904	2.508	2.300	.91706	30
40	.4014	.4383	1.0918	2.491	2.282	.91590	20
50	.4041	.4417	1.0932	2.475	2.264	.91472	10
							66
							° ′
	Cosin.	Cotg.	Cosec.	Sec.	Tan.	Sin.	Angle

Angle	Sin.	Tan.	Sec.	Cose.	Cotg.	Cosin.	
° ′							
24	.4067	.4452	1.0946	2.459	2.246	.91355	66
10	.4094	.4487	1.0961	2.443	2.229	.91236	50
20	.4120	.4522	1.0975	2.427	2.211	.91116	40
30	.4147	.4557	1.0989	2.411	2.194	.90996	30
40	.4173	.4592	1.1004	2.396	2.177	.90875	20
50	.4200	.4628	1.1019	2.381	2.161	.90753	10
25	.4226	.4663	1.1034	2 366	2.145	.90631	65
10	.4253	.4699	1.1049	2.351	2.128	.90507	50
20	.4279	.4734	1.1064	2.337	2.112	.90383	40
30	.4305	.4770	1.1079	2.323	2.097	.90259	30
40	.4331	.4806	1.1095	2.309	2.081	.90133	20
50	.4358	.4841	1.1110	2.295	2.066	.90007	10
26	.4384	.4877	1.1126	2.281	2.050	.89879	64
10	.4410	.4913	1.1142	2 268	2.035	89752	50
20	.4436	.4950	1.1158	2.254	2.020	.89623	40
30	.4462	.4986	1 1174	2.241	2 006	.89493	30
40	.4488	5022	1.1190	2.228	1.991	.89363	20
50	4514	.5059	1.1207	2.215	1.977	89232	10
27	4540	.5095	1.1223	2.203	1.963	.89101	63
10	.4566	.5132	1.1240	2.190	1.949	.88968	50
20	.4592	.5169	1.1257	2.178	1.935	.88835	40
30	.4617	.5206	1.1274	2.166	1.921	.88701	30
40	.4643	.5243	1.1291	2.154	1 907	.88566	20
50	.4669	.5280	1.1308	2.142	1 894	.88431	10
28	4695	.5317	1.1326	2.130	1 881	.88295	62
10	.4720	5354	1.1343	2.119	1.868	.88158	50
20	.4746	5392	1.1361	2.107	1.855	.88020	40
30	.4772	5430	1.1379	2.096	1.842	.87882	30
40	.4797	5467	1.1397	2 085	1 829	87743	20
50	.4823	.5505	1.1415	2.073	1.816	.87603	10
29	.4848	5543	1.1434	2 063	1.804	.87462	61
10	.4874	5581	1.1452	2.052	1.792	.87321	50
20	.4899	5619	1.1471	2.041	1.780	87178	40
30	.4924	5658	1.1490	2.031	1.767	.87036	30
40	.4950	5696	1.1509	2 020	1.756	86892	20
50	4975	5735	1.1528	2.010	1.744	.86748	10
30	.5000	.5774	1.1547	2.000	1.732	.86603	60
10	.5025	5812	1 1566	1.990	1.720	.86457	50
20	.5050	5851	1.1586	1.980	1.709	.86310	40
30	.5075	5890	1.1606	1.970	1 698	.86163	30
40	.5100	5930	1.1626	1.961	1.686	.86015	20
50	.5125	.5969	1.1646	1.951	1.675	85866	10
31	.5150	6009	1.1666	1.942	1.664	.85717	59
10	.5175	6048	1.1687	1.932	1.653	.85567	50
20	.5200	6088	1.1707	1.923	1.643	.85416	40
30	.5225	6128	1.1728	1 914	1.632	.85264	30
40	.5250	6168	1.1749	1.905	1.621	.85112	20
50	.5275	6208	1.1770	1.896	1.611	.84959	10
							58
							° ′
	Cosin.	Cotg.	Cosec.	Sec.	Tan.	Sin.	Angle

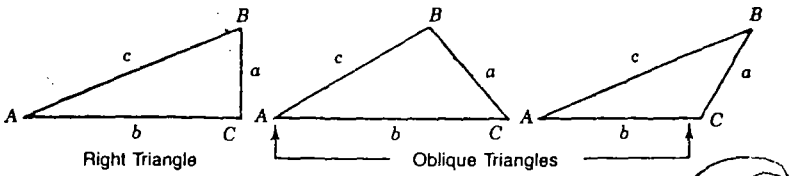
Angle	Sin.	Tan.	Sec.	Cosec.	Cotg.	Cosin.	
° ′							
32	.5299	.6249	1.1792	1.887	1.600	.84805	58
10	.5324	.6289	1.1813	1.878	1.590	.84650	50
20	.5348	.6330	1.1835	1.870	1.580	.84495	40
30	.5373	.6371	1.1857	1.861	1.570	.84339	30
40	.5398	.6412	1.1879	1.853	1.560	.84182	20
50	.5422	.6453	1.1901	1.844	1.550	.84025	10
33	.5446	.6494	1.1924	1.836	1.540	.83867	57
10	.5471	.6536	1.1946	1.828	1.530	.83708	50
20	.5495	.6577	1.1969	1.820	1.520	.83549	40
30	.5519	.6619	1.1992	1.812	1.511	.83389	30
40	.5544	.6661	1.2015	1.804	1.501	.83228	20
50	.5568	.6703	1.2039	1.796	1.492	.83066	10
34	.5592	.6745	1.2062	1.788	1.483	.82904	56
10	.5616	.6787	1.2086	1.781	1.473	.82741	50
20	.5640	.6830	1.2110	1.773	1.464	.82577	40
30	.5664	.6873	1.2134	1.766	1.455	.82413	30
40	.5688	.6916	1.2158	1.758	1.446	.82248	20
50	.5712	.6959	1.2183	1.751	1.437	.82082	10
35	.5736	.7002	1.2208	1.743	1.428	.81915	55
10	.5760	.7046	1.2233	1.736	1.419	.81748	50
20	.5783	.7089	1.2258	1.729	1.411	.81580	40
30	.5807	.7133	1.2283	1.722	1.402	.81412	30
40	.5831	.7177	1.2309	1.715	1.393	.81242	20
50	.5854	.7221	1.2335	1.708	1.385	.81072	10
36	.5878	.7265	1.2361	1.701	1.376	.80902	54
10	.5901	.7310	1.2387	1.695	1.368	.80730	50
20	.5925	.7355	1.2413	1.688	1.360	.80558	40
30	.5948	.7400	1.2440	1.681	1.351	.80386	30
40	.5972	.7445	1.2466	1.675	1.343	.80212	20
50	.5995	.7490	1.2494	1.668	1.335	.80038	10
37	.6018	.7536	1.2521	1.662	1.327	.79864	53
10	.6041	.7581	1.2549	1.655	1.319	.79688	50
20	.6065	.7627	1.2577	1.649	1.311	.79512	40
30	.6088	.7673	1.2605	1.643	1.303	.79335	30
40	.6111	.7720	1.2633	1.636	1.295	.79158	20
50	.6134	.7766	1.2661	1.630	1.288	.78980	10
38	.6157	.7813	1.2690	1.624	1.280	.78801	52
10	.6180	.7860	1.2719	1.618	1.272	.78622	50
20	.6202	.7907	1.2748	1.612	1.265	.78442	40
30	.6225	.7954	1.2778	1.606	1.257	.78261	30
40	.6248	.8002	1.2808	1.601	1.250	.78079	20
50	.6271	.8050	1.2838	1.595	1.242	.77897	10
° ′	Cosin.	Cotg.	Cosec.	Sec.	Tan.	Sin.	Angle

Angle	Sin.	Tan.	Sec.	Cosec.	Cotg.	Cosin.	
° ′							
39	.6293	.8098	1.2868	1.589	1.235	.77715	51
10	.6316	.8146	1.2898	1.583	1.228	.77531	50
20	.6338	.8195	1.2929	1.578	1.220	.77347	40
30	.6361	.8243	1.2959	1.572	1.213	.77162	30
40	.6383	.8292	1.2991	1.567	1.206	.76977	20
50	.6406	.8342	1.3022	1.561	1.199	.76791	10
40	.6428	.8391	1.3054	1.556	1.192	.76604	50
10	.6450	.8441	1.3086	1.550	1.185	.76417	50
20	.6472	.8491	1.3118	1.545	1.178	.76229	40
30	.6494	.8541	1.3151	1.540	1.171	.76041	30
40	.6517	.8591	1.3184	1.535	1.164	.75851	20
50	.6539	.8642	1.3217	1.529	1.157	.75661	10
41	.6561	.8693	1.3251	1.524	1.150	.75471	49
10	.6583	.8744	1.3284	1.519	1.144	.75280	50
20	.6604	.8796	1.3318	1.514	1.137	.75088	40
30	.6626	.8847	1.3352	1.509	1.130	.74896	30
40	.6648	.8899	1.3386	1.504	1.124	.74703	20
50	.6670	.8952	1.3421	1.499	1.117	.74509	10
42	.6691	.9004	1.3456	1.494	1.111	.74314	48
10	.6713	.9057	1.3492	1.490	1.104	.74120	50
20	.6734	.9110	1.3527	1.485	1.098	.73924	40
30	.6756	.9163	1.3563	1.480	1.091	.73728	30
40	.6777	.9217	1.3600	1.476	1.085	.73531	20
50	.6799	.9271	1.3636	1.471	1.079	.73333	10
43	.6820	.9325	1.3673	1.466	1.072	.73135	47
10	.6841	.9380	1.3711	1.462	1.066	.72937	50
20	.6862	.9435	1.3748	1.457	1.060	.72737	40
30	.6884	.9490	1.3786	1.453	1.054	.72537	30
40	.6905	.9545	1.3824	1.448	1.048	.72337	20
50	.6926	.9601	1.3863	1.444	1.042	.72136	10
44	.6947	.9657	1.3902	1.440	1.036	.71934	46
10	.6967	.9713	1.3941	1.435	1.030	.71732	50
20	.6988	.9770	1.3980	1.431	1.024	.71529	40
30	.7009	.9827	1.4020	1.427	1.018	.71325	30
40	.7030	.9884	1.4061	1.422	1.012	.71121	20
50	.7050	.9942	1.4101	1.418	1.006	.70916	10
	.7071	1.	1.414	1.414	1.	.70711	45
° ′	Cosin.	Cotg.	Cosec.	Sec.	Tan.	Sin.	Angle

April 16 KES mob, Dam Removal
April 9 MEETS, RW Collins OFFSite
Spoils management.
Dams will be Dumped. FILLED IN

312 .276 7775 Project Cellphone (BTV)

TRIGONOMETRIC FORMULÆ



Solution of Right Triangles

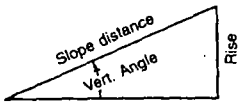
For Angle A. $\sin = \frac{a}{c}$, $\cos = \frac{b}{c}$, $\tan = \frac{a}{b}$, $\cot = \frac{b}{a}$, $\sec = \frac{c}{b}$, $\operatorname{cosec} = \frac{c}{a}$

Given	Required	
a, b	A, B, c	$\tan A = \frac{a}{b} = \cot B$, $c = \sqrt{a^2 + b^2} = a\sqrt{1 + \frac{b^2}{a^2}}$
a, c	A, B, b	$\sin A = \frac{a}{c} = \cos B$, $b = \sqrt{(c+a)(c-a)} = c\sqrt{1 - \frac{a^2}{c^2}}$
A, a	B, b, c	$B = 90° - A$, $b = a \cot A$, $c = \frac{a}{\sin A}$
A, b	B, a, c	$B = 90° - A$, $a = b \tan A$, $c = \frac{b}{\cos A}$
A, c	B, a, b	$B = 90° - A$, $a = c \sin A$, $b = c \cos A$,

Solution of Oblique Triangles

Given	Required	
A, B, a	b, c, C	$b = \frac{a \sin B}{\sin A}$, $C = 180° - (A + B)$, $c = \frac{a \sin C}{\sin A}$
A, a, b	B, c, C	$\sin B = \frac{b \sin A}{a}$, $C = 180° - (A + B)$, $c = \frac{a \sin C}{\sin A}$
a, b, C	A, B, c	$A + B = 180° - C$, $\tan \frac{1}{2}(A - B) = \frac{(a-b)\tan \frac{1}{2}(A+B)}{a+b}$, $c = \frac{a \sin C}{\sin A}$
a, b, c	A, B, C	$s = \frac{a+b+c}{2}$, $\sin \frac{1}{2}A = \sqrt{\frac{(s-b)(s-c)}{b\,c}}$, $\sin \frac{1}{2}B = \sqrt{\frac{(s-a)(s-c)}{a\,c}}$, $C = 180° - (A + B)$
a, b, c	Area	$s = \frac{a+b+c}{2}$, area $= \sqrt{s(s-a)(s-b)(s-c)}$
A, b, c	Area	area $= \frac{b\,c \sin A}{2}$
A, B, C, a	Area	area $= \frac{a^2 \sin B \sin C}{2 \sin A}$

REDUCTION TO HORIZONTAL



Horizontal distance = Slope distance multiplied by the cosine of the vertical angle. Thus: slope distance = 319.4 ft. Vert. angle = 5° 10′. From Table, Page IX. cos 5° 10′ = .9959. Horizontal distance = 319.4 × .9959 = 318.09 ft.

Horizontal distance also = Slope distance minus slope distance times (1 – cosine of vertical angle). With the same figures as in the preceding example, the following result is obtained. Cosine 5° 10′ = .9959. 1 – .9959 = .0041. 319.4 × .0041 = 1.31. 319.4 – 1.31 = 318.09 ft.

When the rise is known, the horizontal distance is approximately: – the slope distance less the square of the rise divided by twice the slope distance. Thus: rise = 14 ft., slope distance = 302.6 ft. Horizontal distance $= 302.6 - \frac{14 \times 14}{2 \times 302.6} = 302.6 - 0.32 = 302.28$ ft.

④ Margaret E. Mulkerrin 05/31/01

PERSONNEL PRESENT

LEE OROSZ	MWCI
MATT GROSTICK	MWA
STEVE FIELD	MEI
ETIENNE CAMEL	KES
STEVEN WOLCOTT	KES
JAMIE BERGERON	KES
JACK FIELD	KES
MAUREEN HANDLER	KES
CARIS DALY	MWA
MIKE REXING	KES
ROB ADAMS	MWA
ALEX ELLWOOD	MWA
TODD LEWIS	MWCI
M. MULKERRIN	BVSPC
TOM TINICS	MWCI
PETER VAGT	MWA
MIKE CHENOWETH	SIMILABS
MARK FULLER	CEC INC
KEVIN FALVEY	SI

1300 PICTURE 11 ROLL 10 FACING EAST. KES GRADING AREA 'A' WITH CLEAN FILL

1345 SPOKE WITH TODD LEWIS RE: ROLL OFF BOXES. HE STATED THAT THEY WOLD

Margaret E. Mulkerrin

⑤ Margaret E. Mulkerrin 05/31/01

BE KEPT JUST WEST OF THE DRUM STAGING PAD ALONG THE NORTHERN FENCELINE. I INQUIRED IF THEY WERE PLANNING ON PUTTING CAUTION TAPE OR ORANGE FENCING AROUND (SIMILAR TO THE STAGED DRUMS) TODD SAID THEY WOULD DO THAT

1500 LEAVE SITE

Margaret E. Mulkerrin
May 31, 2001

Margaret E. Mulkerrin

② Margaret E. Mulkerrin 05/31/01

MEETING NOTES CONTINUED:

- HOW TO HANDEL ROLL OFF BOXES? M. GROSTICK STATED THAT WILL BE ON A CASE BY CASE BASIS - BASED ON AIR MONITORING RESULTS & TYPE OF WORK. MAY REQUIRE LEVEL B. AGREED THAT NOTHING CAN BE DONE UNLESS SAFETY PROCEDURES ARE DECIDED ABOUT.
- AIR MONITORING CONTINUES IN OFFSITE AREA. VOC pile HAS BEEN REGRADED & THERE IS AN ODOR. AIR MONITORING RESULTED IN 10 PPM. WILL CONTINUE TO MONITOR.
- DRUM TOTALS: MW DISTRIBUTED A BREAKDOWN OF DAILY PRODUCTION FOR THE DRUM REMOVAL
- SAMPLES WILL BE SENT TOMORROW TO LAB, RESULTS NEXT WEEK.
- KES PLANS TO DEMOB TOMORROW.
- MW WILL GPS THE DRUM REMOVAL AREA.
- PPE USED WILL BE SECURED ON THE PAD.
- DETENTION BASIN IN OFFSITE AREA IS 70% COMPLETE.
- VOC & PCB PILES HAVE BEEN MOVED. IDW WASTE HAS BEEN SHEARED & PLACED IN UPPER AQUIFER SPOILS PILE.
- SILT FENCE IS IN PLACE IN OFFSITE AREA.
- THE ACCESS ROAD TO THE PROPOSED BLOWER

Margaret E. Mulkerrin

③ Margaret E. Mulkerrin 05/31/01

WILL COME FROM THE SOUTH GATE, RATHER THAN THE NORTH GATE AS PROPOSED.

- WILL BEGIN TO CUT WESTERN SWALE, ROUGH GRADING WILL BE COMPLETE NEXT WEEK.
- GWTP SHUT DOWN FRI-TUES DUE TO A BACKUP.
- EW11 & EW20 WILL BE TAKEN OFFLINE TODAY.
- MAY MAINTAIN ONSITE AREA THRU THE USE OF EW10.
- JUNE 6TH EXPECTING A SUBMITTAL FROM THE OXIDIZER VENDOR. JUNE 12TH THE VENDOR WILL BE ONSITE.
- NEXT WEEK OR TWO, A PILOT STUDY IN THE OFFSITE AREA TO DETERMINE THE BEST METHOD FOR THE SVE WELL INSTALLATION. OPTIONS INCLUDE: AUGER, SONIC, BUCKET, LANDFILL. HAVE NOT SELECTED A DRILLER YET.
- THE INTERIM CAP SHOULD BE INSTALLED IN THE NEXT 1-2 WEEKS. WILL PROCEED TO FINAL CAP IN NON-ENGINEERED AREAS.

END OF MEETING NOTES.

1130 PICTURE 10 ROLL 10 FACING NORTH IN ONSITE AREA. KOESTER DECONNING EQUIPMENT.

Margaret E. Mulk

CONTENTS

PAGE NO.	REFERENCE	DATE

① Margaret E. Mulkerrin 05/31/01

0730 ARRIVE ONSITE WEATHER: 50°F, LIGHT WIND PARTLY CLOUDY.

0800 ONSITE AREA: KES HAS BEGUN TO DECON EQUIPMENT, THE EXCAVATION IN AREA 'B' HAS BEEN ALMOST COMPLETELY BACKFILLED. THE EXCLUSION ZONE HAS BEEN RE-DEFINED TO INCORPORATE ONLY THE DRUM STAGING PAD.

0900 OFFSITE AREA: THE WORK ON THE DETENTION POND HAS BEEN DELAYED UNTIL THE POND CAN DRY OUT, & SMALLER EQUIPMENT IS AVAILABLE. RIGHT NOW THE BOTTOM IS WET & TO TRY TO PLACE RIP RAP WOULD ONLY CAUSE IT TO SINK INTO THE SOIL. TODAY THEY HAVE A DOZER OUT TO COVER THE PILE OF K-P DEBRIS, IDW DRUM DEBRIS. CHRIS DALY OF M.W. IS USING A POWER AUGER TO DEVELOP A CLAY MAP.

1000 WEEKLY CONSTRUCTION MEETING NOTES

- WILL SUBMIT FINAL AIR MONITORING RESULTS TO EPA
- HAVE DOWNGRADED SITE TO LEVEL D DUE TO THE COMPLETION OF INTRUSIVE ACTIVITIES. WILL WEAR SPLASH PROTECTION TO DECON. EQUIPMENT.
- NO LONGER DUMPING FROM ONSITE AREA TO FIREPOND.
- EXCLUSION ZONE WILL NOW ONLY INCORPORATE STAGING PAD.

Margaret E. Mulkerrin

Site: American Chemical Services, Inc.
Proj. #: 46526
Roll: 12A Photo #1
Date: 05-03-01 Time: 10:00
Photographer: Larry Campbell
Description: Photo facing northwest showing overpacked drum and workers at Drum Area A in the onsite area.

Site: American Chemical Services, Inc.
Proj. #: 46526
Roll: 12A Photo #:2
Date: 05-03-01 Time: 10:05
Photographer: Larry Campbell
Description: Photo facing west showing the western edge of excavation in Drum Removal Area A. Drum carcases are visible beneath excavator tracks

Site: American Chemical Services, Inc.
Proj. #: 46526
Roll: 12A Photo #:3
Date: 05-03-01 Time: 10:15
Photographer: Larry Campbell
Description: Photo facing north showing pile of drum carcases removed from Drum Removal Area A.

Site: American Chemical Services, Inc.
Proj. #: 46526
Roll: 12A Photo #:4
Date: 05-03-01 Time: 10:25
Photographer: Larry Campbell
Description: Photo facing south showing soil removed from Drum Removal Area A that's been dumped in the south end of firepond.

Site: American Chemical Services, Inc.
Project: 46526
Photo: 1 Roll: 9
Date: 5-10-01 Time: 11:30
Photographer: Margaret Mulkerrin
Description: Photo facing east in onsite area. Drum excavation in Area A. Drums waiting to be placed in overpack.

Site: American Chemical Services, Inc.
Project: 46526
Photo: 2 Roll: 9
Date: 5-22-01 Time: 07:50
Photographer: Margaret Mulkerrin
Description: Photo facing northwest in onsite area. Excavation in Area B.

Site: American Chemical Services, Inc.
Project: 46526
Photo: 3 Roll: 9
Date: 5-22-01 Time: 09:00
Photographer: Margaret Mulkerrin
Description: Photo facing north. R.W. Collins excavating detention pond.

Site: American Chemical Services, Inc.
Project: 46526
Photo: 4 Roll: 9
Date: 5-22-01 Time: 09:10
Photographer: Margaret Mulkerrin
Description: Photo facing south. R.W. Collins shearing material in south offsite area.

Site: American Chemical Services, Inc.
Project: 46526
Photo: 5 Roll: 9
Date: 5-22-01 Time: 09:50
Photographer: Margaret Mulkerrin
Description: Photo facing northwest in onsite area. KES excavating Area B. Orange residue leaking from drums.

Site: American Chemical Services, Inc.
Project: 46526
Photo: 6 Roll: 9
Date: 5-22-01 Time: 09:55
Photographer: Margaret Mulkerrin
Description: Photo facing northwest in onsite area. KES placing drum in overpack in Area B.

Site: American Chemical Services, Inc.
Project: 46526
Photo: 7 Roll: 9
Date: 5-22-01 Time: 10:00
Photographer: Margaret Mulkerrin
Description: KES sampling drums on drum staging pad in onsite area.

Site: American Chemical Services, Inc.
Project: 46526
Photo: 8 Roll: 9
Date: 5-22-01 Time: 11:00
Photographer: Margaret Mulkerrin
Description: Photo facing northwest in onsite area. Picture of firepond.

Site: American Chemical Services, Inc.
Project: 46526
Photo: 9 Roll: 9
Date: 5-22-01 Time: 11:00
Photographer: Margaret Mulkerrin
Description: Photo facing southeast. Picture of firepond with relocated Area A & B contaminated soil.

Site: American Chemical Services, Inc.
Project: 46526
Photo: 10 Roll: 9
Date: 5-22-01 Time: 11:35
Photographer: Margaret Mulkerrin
Description: Photo facing west. Montgomery Watson sampling ORC Well 104 at the southeast corner of Reder & Colfax.

Site: American Chemical Services, Inc.
Project: 46526
Photo: 11 Roll: 9
Date: 5-22-01 Time: 14:05
Photographer: Margaret Mulkerrin
Description: Photo facing northwest in onsite area. Area B excavation. The white residue is a result of punctured drums.

Site: American Chemical Services, Inc.
Project: 46526
Photo: 12 Roll: 9
Date: 5-24-01 Time: 12:45
Photographer: Margaret Mulkerrin
Description: Photo facing south in onsite area. Excavation in Area B, just before backfilling begins.

Site: American Chemical Services, Inc.
Project: 46526
Photo: 13 Roll: 9
Date: 5-24-01 Time: 12:45
Photographer: Margaret Mulkerrin
Description: Photo facing west northwest in onsite area. Excavation in Area B, just before backfilling begins.

Site: American Chemical Services, Inc.
Project: 46526
Photo: 14 Roll: 9
Date: 5-24-01 Time: 12:45
Photographer: Margaret Mulkerrin
Description: Photo facing northwest in onsite area. Excavation in Area B, just before backfilling begins.

E1 21 of 1

Site: American Chemical Services, Inc.
Project: 46526
Photo: 15 Roll: 9
Date: 5-24-01 Time: 12:45
Photographer: Margaret Mulkerrin
Description: Photo facing northwest in onsite area. Excavation in Area B, just before backfilling begins.

Site: American Chemical Services, Inc.
Project: 46526
Photo: 1 Roll: 10
Date: 5-24-01 Time: 13:15
Photographer: Margaret Mulkerrin
Description: Photo facing northwest in south offsite area. Debris from KP building being placed in upper aquifer spoils pile.

Site: American Chemical Services, Inc.
Project: 46526
Photo: 2 Roll: 10
Date: 5-24-01 Time: 13:30
Photographer: Margaret Mulkerrin
Description: Photo facing north in south offsite area. MEI & R.W. Collins placing adjusting ring on well manhole.

Site: American Chemical Services, Inc.
Project: 46526
Photo: 3 Roll: 10
Date: 5-30-01 Time: 08:40
Photographer: Margaret Mulkerrin
Description: Photo facing northwest in south offsite area. Picture of detention pond outlet structure.

Site: American Chemical Services, Inc.
Project: 46526
Photo: 4 Roll: 10
Date: 5-30-01 Time: 08:45
Photographer: Margaret Mulkerrin
Description: Photo facing southeast in south offsite area. Photo of regrading of SVOC pile.

Site: American Chemical Services, Inc.
Project: 46526
Photo: 5 Roll: 10
Date: 5-30-01 Time: 08:50
Photographer: Margaret Mulkerrin
Description: Photo facing south. Metal debris in south offsite area.

Site: American Chemical Services, Inc.
Project: 46526
Photo: 6 Roll: 10
Date: 5-30-01 Time: 09:00
Photographer: Margaret Mulkerrin
Description: Photo facing southeast. Photo of regraded PCB pile.

Site: American Chemical Services, Inc.
Project: 46526
Photo: 7 Roll: 10
Date: 5-30-01 Time: 12:30
Photographer: Margaret Mulkerrin
Description: Photo facing southwest. Picture of firepond.

Site: American Chemical Services, Inc.
Project: 46526
Photo: 10 Roll: 10
Date: 5-31-01 Time: 11:30
Photographer: Margaret Mulkerrin
Description: Photo facing north in onsite area. Photo of KES deconning equipment.

Site: American Chemical Services, Inc.
Project: 46526
Photo: 11 Roll: 10
Date: 5-31-01 Time: 13:00
Photographer: Margaret Mulkerrin
Description: Photo facing east. KES regrading Area "A" with clean fill.